Remedial Environmental Impact Assessment Report: Non-Technical Summary

Peat Extraction Activities at the Ballivor Bog Group, Co. Meath & Westmeath. Substitute Consent Application

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NON-TECHNICAL SUMMARY

1.1 Introduction

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared by MKO on behalf of Bord na Móna Energy Ltd. a subsidiary of Bord na Móna plc. (hereafter 'the Applicant'), as part of an application for substitute consent for peat extraction and all peat extraction related activities from July 1988 to the present day that have been carried out within the Ballivor Bog Group (namely Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs, which are hereafter referred to as the 'Application Site'), located in Counties Meath and Westmeath. Section 177E of the Planning and Development Act 2000, as amended, permits an application to be made for substitute consent in respect of development which has been carried out where an Environmental Impact Assessment (EIA), screening for EIA and/or Appropriate Assessment (AA) was or is required. The townlands in which each of the 5 no. bogs are located are shown below in Table 1.

Neither the European Union Council Directive 85/337/EEC of 27th June 1985 on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the 'EIA Directive') nor the European Union Council Directive 92/43/EEC of 21st May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the 'Habitats Directive') has retrospective effect; neither Directive imposes legal requirements to have carried out prior assessments of projects which had already commenced or been completed. There was, therefore, no legal requirement for EIA, screening for EIA or Appropriate Assessment in respect of any project prior to the latest dates for transposition of the Directives. In the case of the EIA Directive, the latest date for transposition was 3rd July 1988. In the case of the Habitats Directive, the latest date for transposition was 10th June 1994.

The application for substitute consent is seeking consent for development which took place from July 1988,[1] the timeframe for when the EIA Directive was required to be transposed into Irish Law, to present day.

Table 1 Townlands within which the Application Site is located.

Bog Reference	County	Townlands - Meath	Townlands - Westmeath	Spatial Footprint (ha)
Ballivor	Meath / Westmeath	Clondalee More, Derryconor, Clonycavan, Robinstown Killaconnigan	Grange More, Riverdale	638
Bracklin (including Hill of Downey)	Westmeath	N/A	Craddanstown, Bracklin, Killagh, Ballynaskeagh Ballynaskeagh , Mucklin	772
Carranstown	Meath / Westmeath	Killaconnigan, Carranstown Little, Carranstown Great	Grange More	304
Lisclogher	Meath / Westmeath	Coolronan	Lisclogher Great, Cockstown, Clonleame, Bracklin Clonmorrill	479
Lisclogher West	Westmeath	N/A	Bracklin, Ballyhealy or Ballinure, Bolandstown, Martinstown Ballyhealy .	228
Total Spatial Footprint: 2,421 ha				

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

Applicant

Bord na Móna plc. and its subsidiaries is an Irish, semi-state climate solutions company helping lead Ireland towards a climate neutral future. Bord na Móna has been serving communities for over 90 years, always rising to meet the needs of the day. It was founded in 1934 as The Turf Development Board to enhance national energy security through peat harvesting and became Bord na Móna in 1946 following the commencement of the Turf Development Act .

The functions of Bord na Móna as set out under Section 17(1) of the Turf Development Act 1946 were:

> *"(a) to produce and market turf and turf products, and*
> *(b) to foster the production and use of turf and turf products, and*
> *(c) to acquire bogs and other lands, and*
> *(d) to manage, develop and work bogs and other lands vested in the Board, and*
> *(e) generally to do all such other things as arise out of, or are consequential upon, the duties mentioned in the preceding paragraphs of this section."*

Today, the company has radically changed its approach to face an even greater challenge: climate change. Bord na Móna have ended peat harvesting and now focus on developing climate solutions in renewable energy, sustainable waste management, carbon storage, and biodiversity conservation. Ireland has committed to ambitious climate goals and Bord na Móna's climate solutions are helping to achieve them. Bord na Móna's vision is to help Ireland reach net zero greenhouse gas emissions by 2050.

To power a net zero future, Bord na Móna are expanding its renewable energy infrastructure. Although they have been constructing and maintaining large-scale infrastructure for decades, the company is now using that experience to build renewable energy developments across the country. These developments are transforming the way the nation generates and consumes energy. Ireland has committed to generating 80% of electricity from renewable sources by 2030 and Bord na Móna is working across wind, solar, biomass and biogas to help achieve this target and to provide energy security for future generations.

Bord na Móna currently provides employment for approximately 1,500 people and manages a land holding of over 80,000 hectares located mainly in the Irish midlands. At their peak, employment numbers exceeded 7,400 in the early 1960s, with the workforce dropping to approximately 2,000 by the late 1990s.

Project Description

Substitute consent is being sought by the Applicant of their own volition to regularise, without prejudice, the planning status of the Application Site to facilitate appropriate future uses of these lands in compliance with the requirements of the planning system. Substitute consent is being sought for the relevant peat extraction activities and all ancillary works that were undertaken at the Application Site from 1988 onwards, including the following:

i. *Installation of surface water drainage infrastructure at Ballivor Bog Group, specifically at Ballivor, Carranstown, Bracklin, Lisclogher, and Lisclogher West Bogs to facilitate peat extraction activity from 1988 to June 2020;*
ii. *Vegetation clearance to facilitate peat extraction activity from 1988 to June 2020;*
iii. *Industrial scale peat extraction (milled peat and sod peat/moss), specifically at Ballivor, Carranstown, Bracklin, and Lisclogher Bogs from 1988 to June 2020;*
iv. *Use and maintenance of pre-existing ancillary supporting infrastructure and services to facilitate peat extraction and associated activities (e.g., railway infrastructure, fixed fuel tanks, drainage (drains, silt ponds, pumps), machine passes etc.), from 1988 to present day;*

v. *Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0501-01) which commenced from April 2000 onwards to the present day;*
vi. *All associated site development and ancillary works.*

These peat extraction activities and all ancillary works are referred to as the 'Project' as appropriate. For the purposes of this rEIAR, the Project is defined under three different timeframes termed 'phases':

- **'Peat Extraction Phase':** peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June of 2020 (July 1988 – June 2020).
- **'Current Phase':** the management of the Application Site since June 2020 (June 2020 to present).
- **'Remedial Phase':** the activities intended to be carried out at the Application Site into the future.

Purpose and Structure of this rEIAR

The purpose of this rEIAR is to document the current state of the environment in the vicinity of the Application Site and to assess, in accordance with the requirements of the EIA Directive, the likely significant effects which have occurred, or which are occurring, or which can reasonably be expected to occur on the environment due to peat extraction activities and all ancillary works at the Application Site. The scope of the impact assessment is peat extraction activities and all ancillary works from July 1988 to the present day.

The rEIAR submitted by the applicant provides the relevant environmental information to enable the Environmental Impact Assessment (EIA) to be carried out by the competent authority, in this case An Bord Pleanála.

This rEIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Project thereon, the control measures, and proposed mitigation measures. Background information relating to the Project, scoping and consultation undertaken and a description of the Project are presented in separate sections. The grouped format sections describe the impacts of the Project in terms of population and human health, biodiversity, with specific attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EEC; land, soils and geology, water, air quality, climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing, schedule of mitigation and monitoring, and risk of major accidents and vulnerability to disasters.

The chapters of this rEIAR are included in Volume 1 of this rEIAR, and are as follows:

1. *Introduction*
2. *Background to the Development*
3. *Consideration of Reasonable Alternatives*
4. *Description of the Development*
5. *Population and Human Health*
6. *Biodiversity (including Ornithology)*
7. *Land, Soils and Geology*
8. *Hydrology and Hydrogeology*
9. *Air Quality*
10. *Climate*
11. *Noise and Vibration*
12. *Landscape and Visual*
13. *Archaeological, Architectural and Cultural Heritage*
14. *Material Assets (including Traffic and Transport)*
15. *Vulnerability to Major Accidents and Natural Disasters*
16. *Interactions of the Foregoing*

17. *Schedule of Mitigation and Monitoring Measures*

Appendices to the chapters listed above are included in Volume 2 of this rEIAR.

This NTS is laid out in a similar format to the main rEIAR document and comprises a description of the Project (as part of the Development) followed by the existing environment, impacts and control/mitigation measures presented in the grouped format.

1.2 Background

Chapter 2 of the rEIAR provides an extensive historical and operational overview of the Application Site, detailing its inception, development, and transition over several decades. This summary focuses on the significant milestones and operational changes that have shaped the trajectory of the Application Site, with particular attention to the policy influences that guided these changes.

Peat extraction undertaken by the Applicant has a long history, beginning with the establishment of the Turf Development Board Ltd. and evolving through multiple development programs under Bord na Móna and its subsidiaries. Peat as an energy source was crucial on a national scale during the war years and beyond.

Recent updates to substitute consent legislation are presented in the Chapter 2 - Background, highlighting changes in regulatory requirements that affect ongoing and future peat extraction activities. The chapter emphasizes the need for compliance with these updated regulations to ensure sustainable and legally sound operations.

Planning Policy Context

The planning policy context is a critical section of Chapter 2 - Background,, outlining the national, regional, and local policies that influence the commencement and regulation of peat extraction at the Application Site. A summary of the various strategic documents and plans that shaped the operational framework of peat extraction at the Application Site, as outlined in full in Chapter 2, is provided below.

National Policy

As outlined above, the Turf Development Board was founded in 1934 to enhance national energy security through peat harvesting. The utilisation of peat as an indigenous fuel resource came into prominence during the 2nd World War as a consequence of depleted coal reserves within the UK. The 2nd World War highlighted the risks of over-reliance on imported fuel resources within the Irish State; and in 1944, the Turf Development Board was instructed to prepare a comprehensive development programme to implement industrial scale peat production across the state. Bord na Móna was established as a statutory authority responsible for the '*development of the nation's peat resources*' under the Turf Development Act 1946. Bord na Móna began implementing its first development programme (First Post War Plan / First Development Programme), as referred to above, in 1946, which included the commencement of bog development works across peatlands within its management, such as the Ballivor Bog Group.

The increasing demand for electricity in the post-war period indicated that peat production processes would need to be further enhanced and expanded upon to adequately meet national demand. The Turf Development Act 1950, which came into effect in July 1950, contained provisions for the expansion of Bord na Móna activity and the initiation of the Second Development Programme (Second Post-War Plan).

The growing need for resources by the country's electricity generating stations, and the latter oil crisis emerging in the 1970s, highlighted the importance of indigenous fuel resources, and furthermore, Bord na Móna's role in supporting the provision of a robust power system. Against this backdrop, the Turf

Development Act 1975 was passed by the Dáil in August 1975 which gave legislative effect to Bord na Móna's Third Development Programme.

Once a significant contributor to the national fuel mix, the use of peat as an energy source has been in decline over the last few decades, as national policy focus turned to supporting the generation of energy from renewable sources, thereby displacing the use of fossil fuels. The National Climate Change Strategy (2000) highlighted plans for more efficient peat use with new plants replacing older, low-efficiency ones. By 2007, government policy supported mixing biomass with peat to reduce emissions and diversify the national fuel mix. These strategies show peat's historical importance in power generation and its role in supporting rural economies.

The National Planning Framework (NPF), published in February 2018, is Ireland's 20-year strategic plan for economic development and infrastructure investment. It addresses various sectors, including housing, water, transport, energy, health, and education. The NPF serves as the top tier of the national planning policy framework, guiding regional and local development plans. Ireland's population is expected to grow by about 1 million by 2040, reaching approximately 5.7 million. This growth will increase demand on both built and natural environments and the services needed to support them. The NPF emphasizes the need to transition to a low carbon, climate-resilient economy by 2050, leveraging Ireland's renewable energy potential.

Key regional priorities include harnessing renewable energy (wind, solar, biomass, wave energy) and developing greenways and blueways to support rural and regional economies. The NPF aims to integrate climate action into planning decisions, emphasizing renewable energy infrastructure and carbon sink protection. National Policy Objective 54 focuses on reducing Ireland's carbon footprint by aligning climate action with planning systems. National Strategic Outcome 8 highlights the need for new energy systems and grids to support distributed energy generation from renewable sources. The NPF also underscores the importance of rural areas, like the Application Site, in providing sustainable renewable energy. It acknowledges the significant contributions of these areas to the nation's energy needs and their potential for future renewable energy projects.

The draft NPF, published in July 2024, emphasizes green and blue adaptation, including nature-based solutions. It supports a just transition from peat extraction to renewable energy, advocating a shift from fossil fuels to renewable sources.

Published in October 2021, the National Development Plan (NDP) outlines major public investment projects addressing challenges such as climate change. It emphasizes the government's commitment to decarbonization and renewable energy, with significant financial resources allocated to support the Midlands region through the Just Transition. The NDP prioritizes peatland conservation, restoration, and management to reduce carbon emissions and enhance biodiversity. It also aims to establish a low-carbon electricity system, increasing renewable electricity to 80% by 2030.

The National Peatlands Strategy (NPS), published in 2015, provides a framework for managing Irish peatlands to optimize their social, environmental, and economic contributions. It addresses issues related to climate change, forestry, energy, and agriculture, emphasizing the role of peatlands in carbon storage and climate regulation. The NPS advocates sustainable peatland use, minimizing environmental damage, and exploring options for renewable energy on cutover peatlands. It supports peatland rehabilitation to transition towards carbon sequestration and biodiversity enhancement.

The National Biodiversity Action Plan (NBAP) sets objectives to conserve and restore Ireland's biodiversity. It identifies climate change and peat extraction as major threats to biodiversity. The NBAP promotes actions like Bord na Móna's peatland rehabilitation to support biodiversity and climate goals. The rehabilitation of the Application Site aligns with national policies, contributing to climate action and biodiversity objectives by transitioning from peat extraction to renewable energy and ecosystem restoration.

Regional Policy

The Eastern and Midlands Regional Spatial & Economic Strategy (2019) provides a regional planning framework that supports balanced development and environmental sustainability. It integrates local policies and national objectives, ensuring that regional development aligns with broader strategic goals. The RSES acknowledges the need for a low-carbon power system and the potential of cutaway peatlands for renewable energy and other beneficial uses, in line with Bord na Móna's vision. The regularisation and rehabilitation of the Application Site align with these objectives and guiding principles.

Local Policy

The local policy context includes various County Development Plans from Westmeath and Meath counties, outlining specific regulations and guidelines for development activities, including peat extraction. These plans cover different time periods, reflecting evolving priorities and regulatory frameworks.

Westmeath County Development Plans: Spanning from 1986 to 2027, these plans provide a detailed regulatory framework for development activities in Westmeath, including land use, environmental protection, and sustainable development goals.

Meath County Development Plans: Similar to Westmeath, these plans (1994-2027) provide guidelines for sustainable development, with specific provisions for the protection and management of peatlands.

Cumulative Impact Assessment

The EIA Directive mandates assessing cumulative impacts, considering factors like population, biodiversity, land, water, air, climate, and cultural heritage. Each rEIAR chapter addresses potential cumulative effects.

A cumulative impact assessment of the peat extraction activities and all ancillary works and other relevant development was undertaken with the purpose of identifying what influence the Project has had, or potentially could have, on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed and constructed projects and other land-uses in the vicinity of the Application Site.

The four aims are as follows:

1) *To establish the range and nature of existing projects within the cumulative impact study area.*
2) *To summarise the relevant projects which have a potential to create cumulative impacts.*
3) *To establish anticipated cumulative impact findings from expert opinions within each relevant field. Detailed cumulative impact assessments are included in each relevant section of the rEIAR.*
4) *To identify the projects that hold the potential for cumulative interaction within the context of the proposed development and discard projects that will neither directly or indirectly contribute to cumulative impacts.*

Searches were conducted using data from Meath and Westmeath County Councils and An Bord Pleanála's planning portals. All granted planning applications within 1km of the Application Site boundary from 1988 to 2024 were reviewed, as cumulative impacts beyond this distance are unlikely. Additionally, large-scale infrastructure permissions since 2014 within a 5km buffer were identified. Relevant developments include quarrying, industrial projects, agriculture, forestry, renewable energy (including the proposed Ballivor Wind Farm and permitted Bracklyn Wind Farm).

Scoping and Consultation

A scoping report, providing details of the Application Site and the Project, was prepared by MKO and circulated in November 2021. MKO requested the comments of the relevant personnel/bodies in their

respective capacities as consultees with regards to the EIAR process. Following the recent updates made to legislation on governing Substitute Consent, a request for comments on the scoping report was recirculated in February 2024.

Members of the project team and the prospective Applicant met with representatives from An Bord Pleanála on the 30th of May 2024 as part of a pre-application consultation in relation to the substitute consent application. The project team gave an overview of the Project and discussed matters including the works for which substitute consent is being sought, drainage, scoping and updates to legislation.

Conclusion

The chapter underscores the complex regulatory environment governing peat extraction at the Application Site. It highlights the interplay between national, regional, and local policies in shaping sustainable development practices. By adhering to these policies, Bord na Móna aims to regularise (without prejudice) the planning status of peat extraction activities and all ancillary works at the Application Site with the aim of balancing economic activities with environmental stewardship and community interests.

1.3 Consideration of Reasonable Alternatives

This chapter of the rEIAR contains details of the project justification and alternatives considered. The consideration of alternatives typically refers to alternative design, technology, location, size and scale. A 'Do Nothing Scenario' (i.e., an outline of what was likely to happen to the environment should the Project not have been implemented), is included in the Consideration of Reasonable Alternatives chapter.

As discussed above, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. Peat extraction activities commenced at the Application Site in 1948 with the installation of drainage. The 'Do-Nothing' option is defined as the Project having ceased at the Application Site in 1988. Alternatives prior to 1988 are also provided for context, to illustrate how and why, by 1988, peat extraction was so extensively developed as an activity at the Application Site, and how previously explored options informed the continuation of peat extraction beyond 1988 until 2020. It is important to note that while the alternatives to the continuance of the Project after 1988 are examined, as the Project has already taken place, these alternatives are y no longer possible.

The location, nature, landcover and scale of the Application Site determined its selection by Bord na Móna, under powers vested by the Turf Development Act, 1946, as a strategic and important national asset to generate considerable fuel sources for the State. Alternative industries or uses were not possible at the Application Site in 1988 and alternative locations could only be other large scale peat sites which were acquired by the State and also underwent large-scale peat extraction. Thus, alternative locations or industries are not considered a reasonable alternative. Similarly, as peat extraction was already ongoing in 1988 and continued until June 2020, a 'Do-Nothing' option is not credible as the Project has already occurred. Building on the success of operations from 1948 to 1988, the further expansion of peat extraction activities and all ancillary works was undertaken from 1988 at the Application Site in the form of opening up additional areas for extraction at eastern Carranstown and a portion of western Bracklin, as well as the insertion of drainage into Lisclogher West (though Lisclogher West was never subject to peat extraction).

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and

there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

With the implementation of Bord na Móna's Brown-to-Green' Strategy and the permanent cessation of peat extraction at the Application Site in June 2020, the Applicant recognises the opportunity to transform the site into a sustainable, clean, and renewable energy source while simultaneously facilitating peatland rehabilitation at the site and providing opportunities for amenity, tourism and employment. Thus, the selected future proposal for the Application Site includes a proposed wind energy development which can maximise the Application Site's renewable energy potential without significant environmental impact and can coincide harmoniously with peatland rehabilitation plans which are statutory obligation of Bord na Móna under Condition 10 of the IPC Licence. The compatibility of both rehabilitation works associated with Condition 10 of the IPC Licence, and the proposed Ballivor Wind Farm is cumulatively assessed in this rEIAR. The proposed Ballivor Wind Farm was subject to a standalone Environmental Impact Assessment Report, and which also took the peatland rehabilitation plans into consideration.

The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

1.4 Description of the Development

This chapter of the rEIAR provides a description of the activities at the Application Site from 1948 at the onset of site preparation works up to July 1988, a description of the baseline as of July 1988, a description of activities from 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future. As described above, July 1988 is taken as the baseline assessment year for this rEIAR as this is the latest date that the EIA Directive (Council Directive 85/337/EEC) was required to be transposed into Irish legislation. This approach has been taken on a precautionary basis and strictly without prejudice, as EIA may not have been a legal requirement at that time. The assessment period for the rEIAR is from July 1988 to the present day.

Site and Activity Description

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. Ballivor Bog was the first bog on which clearance and drainage works began in 1948 and would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1953. Clearance and drainage work commenced in Bracklin Bog in 1950 and peat extraction commenced there in 1957. Clearance and drainage of Lisclogher Bog began in 1950, with peat extraction commencing in 1960. Annual reports indicate that peat extraction was already underway at Ballivor, Bracklin (main area) and Lisclogher by the 1960s. The earliest aerial mapping available (1973) confirms that by this period, drains were already inserted at Ballivor, Bracklin and Lisclogher Bogs. Aerial imagery from 1988 indicates that by this period, drainage was inserted at Carranstown and in the western portion of Bracklin. However, drainage was not completed at Lisclogher West by 1988.

Table 2 below presents an overview of the peat extraction activities and all ancillary works on the Application Site from 1948 onwards.

Table 2 Peat extraction activity timelines taken from Annual Reports (1951 – 1970, 1984 to 1987)

Bog		Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Began	Extraction Ceased
Ballivor		1948	1953	June 2020
Carranstown	**Western portion of Carranstown**	1974-1987	By 1988* (Western side)	June 2020
	Eastern portion of Carranstown	1974-1987* drainage inserted only 1989-1995* Clearance works	By 1995	June 2020
Bracklin	**Main Bracklin Bog area**	1950	1957	By 2003
	Western portion of Bracklin	1979-1988, drainage inserted throughout Bracklin West By 1988 vegetation clearance in southern portion only	Between 1985 and 1995* at northern portion of Bracklin West By 1988* at southern portion of Bracklin West	June 2020
Lisclogher		1950	1960	March 2003 for milled peat. Sod peat (third party) was extracted in the northeast until 2020.
Lisclogher-West		Minor works commenced in 1973 Main Drainage installed between 1973 and 1988 Drainage was complete post 1988*	N/A	N/A

*Indicated by aerial photography which are included Appendix 4-4 of this rEIAR;

July 1988 – rEIAR Baseline

By July 1988, land use at the Application Site was well established as industrial peat extraction. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in place. The main entrance points to the Application Site were located north and south off the Ballivor-Raharney (R156) road. and the machine pass/rail crossings between Bracklin and Lisclogher bog. The Ballivor Works, which comprised a peat processing plant, canteen, storage sheds, and maintenance buildings, was located in the north of Ballivor Bog, where it is still located in present day.

Peat Extraction Phase (July 1988 – June 2020)

Peat extraction continued at the Application Site from July 1988 until June 2020 when peat extraction ceased across the Application Site. Improvements and modernisation of machinery occurred between 1988 and 2020 which increased the efficiency and speed of operations over this time period. For the Peat Extraction Phase, i.e. from July 1988 to June 2020, peat extraction gradually slowed down and then ceased permanently in June 2020 across the Application Site with the related reduction in fuel handling/refuelling, machinery maintenance and stockpile development. Stockpile removal was completed in 2023, and drainage/silt pond maintenance is currently ongoing.

The volumes of peat removed from the Application Site varied from year to year and were mainly weather dependent. Bord na Móna records indicate that the total volume of peat extracted from July 1988 to 2020 is estimated to be 2,400,815 tonnes.

Environmental Monitoring and Conditions under IPC Licence

Bord na Móna were granted an IPC Licence (P0501-01) for the Derrygreenagh Bog Group (which encompasses the Ballivor Bog Group, and therefore the Application Site) in April 2000. The conditions of the IPC Licence are intended for the protection of the environment and apply from the time of grant of the IPC Licence.

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

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

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

It is the intention of the of the Applicant to continue implementing and practising the mitigation and monitoring measures as listed in the Licence after the site is decommissioned, where applicable.

Current Phase (June 2020 – Present Day)

Decommissioning and Rehabilitation Process

In January 2021, Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction had ceased at the Application Site prior to this in June 2020. The Application Site still operates under the requirements of IPC Licence P0501-01, and any decommissioning works undertaken with respect to peat extraction activities and all ancillary works are in accordance with Condition 10 of the IPC Licence.

From mid-2020 to mid-2021 the operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles

at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

Peatland Climate Action Scheme

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures with the primary aim of optimising climate action benefits of rewetting former industrial peat extraction areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. These measures are separate to those defined by the IPC Licence. This programme has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions.

This scheme is in addition to the IPC Licence requirements and therefore does not form part of this Substitute Consent application and is being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures e.g., bogs such as Carranstown East, Lisclogher West and Bracklin West where PCAS is currently underway.

Remedial Phase

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

Bord na Móna have produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site, and it is the intention of Bord na Móna to rehabilitate the bogs in a phased approach under IPC Licence. Please see Appendix 4-2 for details.

Potential Future Land-Use

In April 2023, Bord na Móna Powergen Ltd., a subsidiary of Bord na Móna Plc., lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarmplanning.ie/). This application was made directly to An Bord Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Planning and Development Act 2000 (as amended).

As discussed in Section 4.8 part of Condition 10 of the IPC Licence (P0501-01), decommissioning and rehabilitation will be carried out as standard remedial measures associated with peat extraction activities and all ancillary works at the Application Site.

Both the enhanced rehabilitation measures (PCAS) and the proposed wind farm are cumulatively assessed in this rEIAR with the future remedial measures that will be carried out at the Application Site a part of the IPC Licence requirements under Condition 10 of the Licence.

1.5 Population and Human Health

This chapter of the rEIAR addresses the impacts on population and human health of peat extraction activities and all ancillary works occurring at the Application Site. The assessments in this chapter determined any likely significant effects that occurred on population and human health (or are likely to occur) namely employment, air quality, dust, noxious emissions, water quality, traffic and transport and general health and safety during the Peat Extraction Phase, Current Phase and Remedial Phase. Furthermore, a baseline assessment of population and human health for the year 1988 was carried out supplemented by Central Statistics Office (CSO) data.

The assessment on population considers the current and historical land use of the Application Site, the current activities occurring within and in the vicinity of the Application Site, and their impacts, if any, on local population and employment. The assessment on human health includes literature review of health impact assessment and the EIA process and a review of the past, current and future activities on air quality, dust, noxious emissions, traffic and transport, and general health and safety. CSO data have been used to inform the population and human health assessment and identify any impacts that may arise as a result of the Project.

There are no dust, water quality, noxious gas emission data prior to the commencement of the IPC Licence condition compliance requirements in 2000. Since 2000, the Applicant have undertaken annual dust monitoring at the Application Site and there has been only one non-compliance events in relation to dust deposition recorded. The exceedance of the limit value was due to an excavator operating directly adjacent to the dust gauge thereby causing a localised non-compliance event. Furthermore, there have been no third party complaints to excessive dust deposition in the area. Long term monitoring of NO_2, PM_{10} and PM_{25} at nearby monitoring stations or comparative locations indicate there were no exceedances to the daily or annual thresholds of NO_2, PM_{10} and PM_{25} in the atmosphere. Since 2000, the Application Site has been operating under IPC Licence noise limits. There have been no incidents of noise exceedances or noise complaints pertaining to peat extraction activities and all ancillary works at the Application Site since records began.

Peat Extraction Phase (July 1988- June 2020)

The Application Site was subject to ongoing industrial peat extraction activities and all ancillary works from July 1988 to June 2020.

The Applicant has been the leading commercial employer for rural communities of the Midlands of Ireland since the late 1950s, employing thousands of workers permanently throughout the decades, both directly in the peat extraction industry and indirectly, through the horticultural industry. Employment numbers at the Application Site leading up to the permanent cessation of activities were significantly lower than in 1988. Since 2000, continuous environmental monitoring and maintenance has been undertaken as required under the IPC Licence P0501-01 which has contributed to employment levels. The Applicant provided ongoing, albeit limited employment through the extraction of peat until June 2020.

Current Phase (June 2020 – Present)

Peat extraction ceased at the Application Site in June 2020; therefore, no peat extraction works are occurring at the Application Site during the Current Phase. All existing stockpiles of peat were removed off the bogs by the end of 2023. Cutaway Bog Decommissioning and Rehabilitation Plans have been prepared and will be agreed with the EPA before being implemented during the Current Phase.

Where possible, the Applicant has provided retraining to employees at the Application Site and provided employment in other Bord na Móna departments and locations. Additionally, in the planning of the cessation of peat extraction across the Bord na Móna landbank, strategies such as the Brown to Green strategy, which involves the transformation of the Applicant from a traditional peat business into a climate solutions company, were being devised. The Applicant still provides employment at the Application Site through environmental monitoring and maintenance as required under the IPC Licence P0501-01 and through the Peatland Climate Action Scheme (PCAS).

Remedial Phase

The Remedial Phase of the Project involves the implementation of Cutaway Bog Decommissioning and Rehabilitation Plans as per the IPC Licence. The current Cutaway Bog Decommissioning and Rehabilitation Plans are presented in Appendix 4-2. The implementation of the rehabilitation plans will require 3-4 number staff for the first two years followed by 1-2 no. staff visiting monthly over 30 years.

1.6 Biodiversity

The biodiversity chapter assesses the likely effects on biodiversity (both alone and cumulatively with other projects) of the peat extraction activities and all ancillary work that took place at the Application Site. The assessment is based on a comprehensive desk study involving a thorough review of information available in relation to the site as well as on detailed ecology surveys undertaken.

The habitats on the Application Site were the subject of a detailed survey and assessment by Bord na Móna ecologists throughout 2011 and 2012 and a detailed habitat map has been produced of the entire Application Site. Multidisciplinary walkover surveys and detailed botanical and faunal surveys were undertaken by MKO ecologists between 2020 and 2024. The survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011).

The Application Site comprises 5 no. bogs characterized predominantly as cutover raised bog. These are Ballivor Bog to the south, Carranstown and Bracklin bogs towards the centre and Lisclogher and Lisclogher West bogs at the northern end of the Application Site. Large areas of the site have been out of peat extraction by Bord na Móna for a significant period of time and thus vegetation, dominated primarily by birch scrub and woodland, common cottongrass and ling heather, has regenerated over much of these areas. Other large areas within Bracklin Bog and Carranstown Bog were undergoing active peat extraction until 2020 and are characterized by relatively large areas of bare peat. Lisclogher West, although drained, was never subject to peat extraction and comprises an area of uncut raised bog. Other small remnants of uncut raised bog occur at various locations, mostly at the peripheries of the Application Site.

By 1988, peat extraction activities and all ancillary works at the Application Site were well established and the Application Site consisted predominantly of a large area of cutover bog, comprising bare peat and smaller areas of revegetating scrub, woodland and pioneer habitats of open cutaway bog.

The Peat Extraction Phase between 1988 and the present day was unlikely to have had a significant negative effect on the habitats, flora and fauna that occurred at the site as these were by 1988 highly modified from their original state, due to either drainage, fragmentation, removal of the acrotelm or peat extraction and in the case of bird species due to loss of habitat.

The Current Phase of the Project, which includes all operations from 2000 to the present day, has been licenced under IPC Licence (No. P0501-01) and has been subject to the conditions of that Licence. The Licence conditions, relating to operation and monitoring, emissions to water and air, water protection, waste management and bog rehabilitation, are intended for the protection, and where possible, the improvement of the environment. With the implementation of the conditions of the IPC Licence, and the much-reduced activity within the Application Site during this time, no significant effects on biodiversity are expected to have occurred during the Current Phase of the Project.

The Remedial Phase of the Project, which includes proposed rehabilitation plans for the Application Site which have also been assessed in this chapter, will generally involve the rewetting and revegetation of the bogs through natural succession. These plans will have a long-term significant positive effect on the habitats and biodiversity within the Application Site, as well as on water quality (as per the conclusions of Chapter 8: Hydrology and Hydrogeology), within and downstream of the Application Site.

A separate remedial Natura Impact Statement (rNIS) has been prepared and concluded that Project, have not and will not have any adverse effect on the integrity of any European Site, either alone or in combination with other plans or projects.

1.7 Land, Soils and Geology

This chapter assesses the likely significant effects that the Project may have on land, soils and geology and was prepared by Hydro Environmental Services (HES).

The Application Site comprises 5 no. Bord na Móna bogs situated between the towns of Kinnegad and Delvin, Co. Westmeath. The bogs comprising the Application Site include Ballivor Bog to the south, Carranstown and Bracklin bogs towards the centre and Lisclogher and Lisclogher West bogs at the northern end of the site. The total Application Site area is approximately 2,421ha (24.21km^2). The current topography of the Application Site is relatively flat with an elevation range of between approximately 69 and 86mOD (metres above Ordnance Datum).

From a land, soils and geology perspective, the main impacts occurred during the early stages of drainage and peat extraction when the acrotelm (topmost living peat layer) was removed and the extraction of the peat (catotelm) began. These impacts occurred at different times across the Application Site ranging from drainage of Ballivor Bog in 1948 to drainage of Lisclogher West in the early 1990s. These site preparation works had been completed across the majority of the Application Site prior to 1988 and any subsequent activities in these areas would not have resulted in any significant changes, with the only effects resulting from minor annual topographic changes associated with peat removal, and other excavations associated with drainage maintenance. However, some areas of the Application Site have undergone site preparation works including vegetation clearance (eastern Carranstown and the northwestern section of Bracklin) and the installation of drainage (Lisclogher West) since 1988. These areas of the site would have experienced a change in soils/land with this change being consistent with the emerging trend established by the wider peat extraction activity within the Application Site. The peat extraction activities and all ancillary works are therefore considered to have resulted in a moderate negative effect on the land, soils and geological environment.

The proposed Cutaway Bog and Decommissioning and Rehabilitation Plans for the Application Site have also been assessed. The plans will typically involve the rewetting and revegetation of the drained bogs. These plans will have a positive effect on the soils/land across the Application Site, with rewetting of bare peat areas. The Application Site will never return fully to the original raised bog which was present before commencement of the peat extraction activities and all ancillary works, but the implementation of the Cutaway Bog and Decommissioning and Rehabilitation Plans will have a positive effect of land and soils/land, and on the coverage of vegetation at ground level across each of the bogs when compared to the 1988 baseline condition of the lands.

This assessment confirms that no cumulative effects on land, soil and geology environment have resulted from the Peat Extraction Phase. Similarly, no cumulative effects will result from the implementation of the decommissioning and rehabilitation plans, nor from the proposed wind farm development at the site. Effects on the land and soils environment will only occur as direct effects, local to the point of extraction/excavation, and therefore cannot extend beyond the boundary of the bogs.

1.8 Hydrology and Hydrogeology

This chapter assesses the likely significant effects that the Project may have on hydrology & hydrogeology and was prepared by Hydro Environmental Services (HES).

Regionally, the Application Site is located in the Boyne surface water catchment. In the west the Application Site drains towards the Deel (Raharney) River, drainage in the north and east is directed towards the Stonyford River while the south of the Application Site drains to the southeast and into the River Boyne. All drainage pathways from the Application Site eventually discharge to the River Boyne.

Currently, the surface of the Application Site is drained by a network of field drains that are typically spaced every 15 to 20m. Larger arterial drains connect the smaller field drains and gently slope towards perimeter silt ponds and surface water outfalls. Surface water outflows from site discharge to small

streams which in turn discharge into the Deel (Raharney) River to the west, the Stonyford River to the east and the River Boyne to the south. All outfalls are drained by gravity with no pumping locations situated within the Application Site.

The Peat Extraction Phase covers the period between 1988 and 2020. The Applicant commenced works at Application Site in 1948. By 1988 peat extraction activities and all ancillary works were well established at Ballivor, Bracklin, Lisclogher and Carranstown. By this time drainage had already been inserted and railway infrastructure had been laid at Ballivor, Carranstown, Bracklin, and Lisclogher bogs. Lisclogher West was drained between 1973 and 1995. The emerging baseline trend was a drained set of bogs with peat extraction activities and all ancillary works having been ongoing for many years.

As a result, the potential impacts from peat extraction activities and all ancillary works were consistent with the baseline environment, and arising potential impacts on water quality from sediment, hydrocarbons, wastewater are all assessed as having moderate potential impacts. Available water quality data or upstream and downstream watercourses, and discharge water quality monitoring from the bogs, do not indicate any significant impacts on water quality occurred during the Peat Extraction Phase.

Since 2000, the Applicant has been operating the Application Site under IPC Licence requirements. The IPC Licence (P0501-01) sets out several conditions and emission limits designed to ensure the protection of surface and groundwaters.

Peat extraction activities and all ancillary works ceased at the Application Site in June 2020 and the assessment concludes that potential impacts on surface water flows and surface water quality, and groundwater quality are neutral during this period. No changes to the hydrological and/or hydrogeological environments will have occurred from Current Phase of the Project i.e. the cessation of peat extraction activities and all ancillary works to the present day.

The proposed decommissioning and Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site have also been assessed. The plans will generally involve the rewetting and revegetation of the drained bogs. These plans will have a long-term positive effect on the local peat hydrogeology within the site where groundwater tables in the peat bogs are stabilised and closer to the bog surface. These plans will also have positive long-term effects on downstream water quality and regulation of surface water flows.

The assessment confirms that no significant cumulative effects on the hydrological or hydrogeological environments have resulted from the various phases of the Project. Similarly, no cumulative effects on the hydrological or hydrogeological environments will result from the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, nor the proposed Ballivor Wind Farm at the Application Site.

1.9 Air Quality

This chapter of the rEIAR describes and assesses the residual direct and indirect air quality impacts of the peat extraction activities and all ancillary works, at the Application Site, and has been prepared by AWN Consulting Limited.

For the purposes of this assessment, while the activities associated with the Project assessed have occurred over the past decades, beginning in 1988 and continuing to present day, impacts have been assessed against the most recently published air quality standards which are likely more stringent than historical standards from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards.

The baseline environment has been established with reference to published air quality data from the Environmental Protection Agency (EPA). Historic air quality monitoring data from the EPA for the

pollutants nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) for representative rural locations was reviewed. The air quality in the region of the Application Site is of generally good quality with concentrations of pollutants below the ambient air quality standards. Historic dust deposition monitoring results for the Application Site indicate that dust nuisance is not an issue in the air quality study area (Study Area) and no complaints regarding dust deposition have been recorded. Air quality has continued to improve in recent years as a result of the implementation of national plans and policies.

Peat Extraction Phase (July 1988- June 2020)

Dust emissions during peat extraction activities and all ancillary works had the potential to impact nearby human and ecological sensitive receptors. The Study Area was deemed of low sensitivity in relation to dust soiling and dust related human health impacts. The Study Area is considered of medium sensitivity in relation to dust related ecological impacts due to the presence of the River Boyne and River Blackwater SAC. It was determined that there was an overall low risk of dust soiling and human health related dust impacts and a medium risk of dust related ecological impacts. As part of the IPC Licence for the Application Site a number of dust control measures were required to be implemented. In addition, dust monitoring was required to ensure dust emissions were not causing issue at nearby sensitive receptors, the results of which indicated that dust emissions from site works were insignificant.

Vehicle exhaust emissions from vehicles accessing the Application Site and transporting peat from the Application Site also had the potential to impact air quality. The historical traffic figures were reviewed, and it was determined that the traffic generated from the peat extraction activities and all ancillary works had an imperceptible impact on the local traffic flows. The impact to air quality as a result of the Peat Extraction Phase was assessed to be long-term, negative, localised and imperceptible.

Current Phase (June 2020 – Present Day)

During the Current Phase, the activity was limited to removal of the existing peat stockpiles off the bogs which was completed in 2023. The material was taken via tipper trucks for loading onto lorries and transported off the Application Site. There was the potential for dust emissions associated with the removal of stockpiled peat. The dust control measures stipulated within the IPC Licence for the Application Site are required to be in place to avoid potential dust issues. Due to the low number of sensitive receptors and the minimal works involved in removing the stockpiled peat from the Application Site, dust emissions are predicted to have been imperceptible.

Due to the low volume of vehicles and machinery involved in the Current Phase, exhaust emissions are predicted to have an imperceptible impact on air quality. The impacts will be short-term, negative and imperceptible with respect to air quality.

Remedial Phase

There are minimal works involved in the Remedial Phase that have the potential to impact air quality. The primary activities will involve re-vegetation of the Application Site, drain blocking and re-wetting of the bogs where possible. There is a worst-case low risk of dust soiling and human health impacts as a result of dust emissions during the Remedial Phase and a medium risk of dust soiling impacts to vegetation in the section of the River Boyne and River Blackwater SAC. The impact to air quality from dust emissions will be short-term, negative and imperceptible.

Emissions from site machinery and vehicles accessing the Application Site during the Remedial Phase will result in a neutral impact to air quality due to the low volume of vehicles involved. The impacts to air quality during the remedial phase will be short-term, neutral and imperceptible.

1.10 Climate

This chapter of the rEIAR describes and assesses the residual direct and indirect climate impacts of the peat extraction activities and all ancillary works, at the Application Site, and has been prepared by AWN Consulting Limited.

For the purposes of this assessment, while the activities assessed have occurred over the past decades, beginning in July 1988 and continuing to present day, impacts have been assessed against the most recently published climate guidance and policies which are likely more stringent than historical policies from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards. The climate impact assessment comprised a quantitative assessment of the carbon emissions as a result of the peat extraction activities and all ancillary works.

Historic climate data were reviewed in reference to Ireland's weather for the surrounding area of the Application Site over the period July 1988 to present day. Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in recent years human activities, which have resulted in the release of greenhouse gases, have impacted on the climate. Climate change has led to an increase in the frequency of extreme weather conditions such as storms, floods and droughts. Historic National greenhouse gas (GHG) emissions published by the Environmental Protection Agency (EPA) were also reviewed and used to inform the climate baseline assessment. National greenhouse gas GHG emissions are required to meet EU specific targets, however Ireland's annual GHG emissions have been in exceedance of these targets thus far.

Peat Extraction Phase (July 1988- June 2020)

The CO_2 emissions associated with the peat extraction activities and all ancillary works over the period 1988 – 2020 were calculated. On average over this 33-year period there was 81,911 tonnes of CO_2 per annum released from the Application Site. Annually this equates to 0.03% of Ireland's 2021 – 2025 carbon budget of 295 $MtCO_2e$ or 0.05% of Ireland's more stringent 2030 – 2035 carbon budget of 151 $MtCO_2e$. The removal of the carbon store of the Application Site and the subsequent release of CO_2 from the peat extraction activities and all ancillary works resulted in a long-term, negative and significant impact to climate.

Current Phase (June 2020 – Present Day)

As peat extraction activities has ceased since June 2020, carbon losses associated with peat removal and the subsequent impact to climate are not relevant to this phase.

There is the potential for some minor GHG emissions associated with vehicles accessing the Application Site for removal of stockpiled peat or for monitoring works. However, the number of vehicles accessing the Application Site will be minimal and GHG emissions associated with these are not predicted to be significant in relation to Ireland's climate budgets and sectoral emissions ceilings. The impact to climate is short-term, negative and imperceptible which is overall not significant.

Remedial Phase

The primary focus of the Cutaway Bog Decommissioning and Rehabilitation Plans is re-wetting the bogs which will aid in restoring the carbon store function and promote the carbon sink potential of the land. The purpose of the Remedial Phase of the Project is in line with a number of key actions and priorities within CAP24 in relation to the rehabilitation of peatlands, specifically those within the mid-lands area. With the restoration of the carbon sink potential of the land, albeit, to a lesser extent than

the potential prior to the historic removal of the peat, the Project will aid in Ireland's trajectory towards net zero by 2050. The impact to climate is considered long-term, neutral and not significant.

1.11 Noise and Vibration

This chapter of the rEIAR describes and assesses the residual direct and indirect noise and vibration impacts of the peat extraction activities and all ancillary works, at the Application Site, and has been prepared by AWN Consulting Limited.

A background noise survey undertaken at the Application Site as part of the proposed Ballivor Wind Farm development to determine baseline noise levels in the receiving environment. The noise monitoring at sensitive receptors was not undertaken during the Current Phase. The representative background noise levels taken at sensitive locations around the Application Site are used to ascertain typical background noise levels during the Peat Extraction Phase and Current Phase.

The assessment of noise and vibration due to each of the three phases has been conducted in accordance with best practice guidance contained in BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise* and BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Vibration*.

Peat Extraction Phase

The types of noise generating peat extraction machines used during the Peat Extraction Phase are detailed in Chapter 4 of this rEIAR, and include the following: Drainage and Bog Preparation Machinery such as Dragline/Shovel Excavator, Peat Extraction Machinery such as Tractors, Windrow Machine, Sod Moss Peat Collector and Milled Peat Harvesters. In addition to these machines, delivery trucks exported peat which had been extracted at the Application Site and transported to Ballivor Works via internal rail, and from there to its end destination by truck, with unladen trucks returning to Ballivor Works daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

From 2000 onwards, the Application Site has operated under IPC Licence P0501-01. Condition 8 of the IPC Licence includes limits on noise levels. As activity on the Application Site has been carried out in daytime hours only, the relevant noise level limit is 55dB $L_{Aeq,30min}$ at noise-sensitive locations. This noise criterion is applied to the Peat Extraction Phase, Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the Application Site for that period.

Since the implementation of the above, there have been no breaches of noise limits by the onsite activities or noise complaints from noise sensitive locations in the vicinity of the Application Site. There are no records of noise complaints ever received regarding the Application Site for the period 1988 to the implementation of the above limits in 2000.

The potential effect at the nearest noise sensitive locations associated with the Peat Extraction Phase are negative, not significant and long-term.

Current Phase:

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on site is much reduced when compared to the Peat Extraction Phase. On site activities are limited to removal of the existing peat stockpiles from Bracklin and Ballivor Bogs, which was completed by the end of 2023. Due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, these movements are at a much lesser volume than

during the Peat Extraction Phase. Based on the predicted noise levels, the Application Site has been in full compliance with the noise limits set out in the IPC Licence during the Current Phase.

The potential effect at the nearest noise sensitive locations associated with the Current Phase are negative, not significant and short-term.

Remedial Phase

The Remedial Phase refers to managed rehabilitation of the bogs in accordance with the requirements of Condition 10 of the IPC Licence. Noise generating machinery will be limited to occasional tractors or excavators to facilitate in the drain blocking process across the Application Site. Again, during this phase, despite the significant reduction in noise generating machinery the Applicant is committed to complying with all conditions, including noise, set out in IPC Licence, where applicable.

The potential effect at the nearest noise sensitive locations associated with the Remedial Phase are neutral, imperceptible and long-term.

1.12 Archaeology and Cultural Heritage

This archaeological, architectural, and cultural heritage chapter was prepared by Tobar Archaeological Services Ltd. It presents the results of an archaeological, architectural and cultural heritage impact assessment for a rEIAR at the Application Site.

Peat Extraction Phase

Recorded Monuments

No recorded monuments are located within the Application Site boundary therefore no direct effects occurred in this regard.

Sub-Surface Archaeology

Bog landscape features were often utilised throughout all periods of history and the anaerobic conditions preserve organic matter, such as wood and leather, which does not often survive in more usual terrestrial archaeological conditions. Objects can be preserved in peatlands because of the acidity of peat and the anaerobic environment which exists within peatland deposits. It is likely that the pre-1988 drainage, shrinkage, compression and the extraction of peat could have had permanent and profound adverse cultural heritage effects should sub-surface finds and features exist in areas which were subject to peat extraction activities and all ancillary works. This is particularly the case between 1988 and 2005 when fewer archaeological investigations and surveys had taken place. The Archaeological Survey of Ireland 2005 Peatland Survey, within the Application Site, would have allowed the identification of any finds, features or deposits on either the peat fields, or along drain sections which would have led to mitigatory investigations and excavations in selected areas within the Application Site.

A number of archaeological surveys were previously carried out as part of the Applicant's 2005 Peatland Survey within these bogs during the lifetime of the peat extraction activities and all ancillary works. A summary of the available results of such surveys and/or any reassessment surveys is presented the chapter. No archaeological sites were discovered during the peatland surveys.

Partial human remains consisting of a torso, head and upper arms were recovered at the Ballivor Works (adjacent to Application Site) on 21st February 2003 by a member of Bord na Móna personnel. As Ballivor Bog produced moss peat, the peat was collected and screened to ensure no foreign objects were within it. The human remains were discovered after screening and deposited with any other non-peat items at the Works. The Applicant was able to identify the location of the stockpile that was being

screened. This was in the townland of Clonycavan approximately 1.5km southeast of the Ballivor Works. The area was inspected and systematically walked by the author (then of ADS Ltd) and Ann Lynch of the DOEHLG (now DoHLGH) during a field visit on the 28th February 2003. On the 12th August 2003 a team of one supervisor, one site assistant and two archaeologists under the direction of Eoin Corcoran, ADS Ltd (Licence Ref.: 03E1221) investigated the find spot by shovel scraping, sweeping and trowelling a 100m long area. No further remains were recovered. This demonstrates the high archaeological potential of the bog.

Numerous stray finds are registered in the National Museum of Ireland for the majority of the 5 no. bogs in the Application Site and again demonstrate the high archaeological potential of the Application Site. The stray finds for each bog are described in the chapter.

It is likely that past peat extraction activities and all ancillary works, prior to 2005 had a negative, permanent and significant effect on any potential sub-surface features or finds within the Application Site in the same way as Clonycavan man was affected by peat activities (although partially recovered out of context). It is possible that the proposed Bog Rehabilitation works activities such as drain blocking, re-wetting, bull dozing of any remaining stockpiles etc will also affect potential archaeological finds, features and deposits. These activities fall under the Code of Practice 2012 in the same way as peat extraction activities and all ancillary works are dealt with. All such activities are being undertaken under the IPC Licence and in this regard, therefore, any mitigation measures implemented are under the remit of the Applicant and the now Department of Housing, Local Government and Heritage and will mitigate the potential for significant effects.

Built Heritage (Protected Structures)

One structure listed in the RPS is located within the Application Site boundary. This consists of the RPS 021-008 Permanent narrow gauge Bord na Móna railway line. The centre point for this structure is located to the northeast of the Ballivor Works, adjacent to the Application Site. The past peat extraction activities and all ancillary works, and the need to transport sod turf and milled peat required the construction of an extensive rail network. The railways have been laid since the 1950s and were extended and re-laid in accordance with the requirements at the time. The permanent railway and its ancillary structures such as level crossing gates have since been added to the Record of Protected Structures and are largely still extant. No effects to the permanent gauge railways were identified as a result of past peat extraction activities and all ancillary works.

Local Cultural Heritage (Tonduff)

This ruinous settlement now contains dry meadow grassland and is surrounded by Birch woodland that has developed on cutover bog, with old face-banks still present. The remains of a 19th century house in ruins are described in the chapter. Past peat extraction activities and all ancillary works have not affected the structure and the 19th century house has survived, albeit ruinous, to the present day.

Current Phase

Current activities at the Application Site include the transportation of previously extracted peat off the bogs and decommissioning, rehabilitation and environmental monitoring as part of the IPC Licence. In terms of archaeology, architecture and cultural heritage, since peat extraction ceased in June 2020, it is considered that no direct effects would occur during the Current Phase.

Potential indirect effects (visual impacts) of the Current Phase are scoped out as the current phase of activities are not considered to have a wider landscape negative effect on the Cultural Heritage Environment. Archaeological monuments and features of architectural heritage merit which are located away from the Application Site are not capable of having their settings affected by localised / transient works within the Application Site. No effects from 2020 to the present day are considered to have occurred since peat extraction has ceased. No control measures are deemed necessary since peat extraction has ceased.

Remedial Phase

The rehabilitation programme falls under Condition 10 of the IPC Licence and any effects as a result of drain blocking or trekking over peat as part of the rehabilitation programme fall under the current Code of Practice (2012) between the Applicant and the now Department of Housing, Local Government and Heritage. The Applicant has produced a Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under IPC Licence. Mitigation measures to be implemented as part of the Cutaway Bog Decommissioning and Rehabilitation Plan programme are under the remit of the aforementioned bodies, therefore the Archaeology Code of Practice will mitigate against the potential for significant effects during this phase. Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect. Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works and in this regard the overall significance of effects will be slight – moderate.

1.13 Landscape and Visual

This chapter has addressed the significance of landscape and visual effects occurring at the Application Site since the 1988 baseline. A vast majority of the Application Site was subject to peat extraction in 1988 and the greatest landscape and visual effects had already occurred prior to the 1988 baseline. No significant landscape and visual effects occurred in these areas during the Peat Extraction Phase.

The greatest landscape and visual effects during the Peat Extraction Phase occurred at the west of Bracklin Bog and east of Carranstown Bog where the lands were stripped, and industrial peat extraction commenced. These areas comprise approximately 10% of the Application Site and were areas of drained bog prior to 1988. Significant landscape effects occurred here where a substantial change occurred within the landscape; these drained peatlands of medium sensitivity transitioned to a landscape of bare cutover peat. Considering the absence of visibility of these peatlands from any high sensitivity visual receptors due to a high level of screening around the bogs, residual visual effects were deemed to be of moderate significance.

Prior to 1988, Lisclogher West Bog included large areas of intact raised bog of high sensitivity. The installation of drainage was competed there during the Peat Extraction Phase causing direct landscape effects of moderate significance. Due to the limited visibility of this bog from any sensitive receptors and the very slight visual change occurring as a result of the drainage activity, visual effects were deemed to be not significant.

Designated Landscape Character Areas were established in 2008 for Co. Westmeath and in 2007 for County Meath. By this time, large areas of the Application Site were not subject to peat extraction. Therefore, no negative change occurred to the landscape character of either County Westmeath Landscape Character Area 3 – River Deel Lowlands or County Meath LCA 15 – South West Lowlands since their inception. Due to the limited visibility of the peat extraction activity beyond roads and residences in the immediate vicinity of the Application Site, which themselves were screened by bog boundary vegetation, no significant visual effects occurred from any scenic amenity designations or any other sensitive receptors existent in the wider landscape.

Some areas of the Application Site have not been subject to peat extraction for considerable time (e.g. peat extraction ceased in large areas of Bracklin bog by 2003, and in Lisclogher bog in 2003), and these areas show signs of revegetation. Peat extraction ceased at the Application Site in June 2020 which has further enabled the landscape of the entire Application Site to continue to re-vegetate. However, the landscape is still currently categorised as a degraded bare cutover peat site of low sensitivity.

On balance, landscape and visual effects during the Current Phase are deemed to be 'Not Significant'. The primary activity of the Remedial Phase is to rewet cutover peatland in order to re-establish a naturally functioning wetland and peatland ecosystem. With the full implementation of the Remedial Phase Cutaway Bog Decommissioning and Rehabilitation Plans, there will be a slight positive landscape and visual impact when compared to the 1988 baseline. Very minor cumulative landscape and visual effects may arise as the works and activities required for implementation of the Remedial Phase are likely to occur within a similar timeline with the works required to construct the permitted Bracklyn Wind Farm (Planning Reference PA25M.311565) and if consented, the proposed Ballivor Wind Farm. (Ref. PA25M.316212).

1.14 Material Assets

Traffic and Transport

This section of the chapter looks at the potential impact that traffic generated from the Peat Extraction Phase, Current Phase and Remedial Phases that the Project had, have or will have on traffic and transport.

This chapter assess the potential effects on roads and local traffic from the additional traffic movements that were generated during the peat extraction process and any traffic generated through ancillary activities pertaining to the extraction industry during the Peat Extraction Phase, including that of staff personnel commute. It also looks at the potential effect that the traffic movements associated with the Current and Remedial Phases at the Application Site may have on roads and traffic, namely remaining stockpiled peat deliveries, staff personnel commute and rehabilitation works.

The peat extracted and stockpiled peat during the Peat Extraction Phase and Current Phase was transported via trucks to various end users around the country. Based on the average annual volume of peat extracted or stockpiled per year at the Application Site and the average volume of peat transported per truck, an estimation of the annual number of Heavy Goods Vehicles (HGV) movements was determined for the Peat Extraction Phase and Current Phase. Employment figures at the Application Site for all Project Phases were also utilised to determine the traffic movements associated with staff personnel travelling to and from the Application Site. An estimation of the annual number of Light Goods Vehicles (LGV) movements was determined for all Project Phases. The average annual traffic movements to and from the Application Site were compared against the average national traffic volumes counted at four identified Transport Infrastructure Ireland (TII) count locations surrounding the Application Site. For the Peat Extraction Phase, TII count data was adjusted to represent a theoretical 1988 year to provide a more representative value for the baseline. It is demonstrated that the additional volume of traffic generated by the Project would have been imperceptible to road users and road conditions, i.e., for the Peat Extraction Phase this equated to 3 - 7% of daily traffic volumes attributed to the Project, and for the Current Phase and Remedial Phase this equated to less than 1% of daily traffic volumes attributed to the Project.

Peat extraction ceased in Lisclogher Bog in 2003 and therefore the railway crossing between this bog and Bracklin went out of use. Locomotives would have crossed the R156 an average of two times per day during the Peat Extraction Phase. Given the low frequency of crossings and the presence of gates and sensory notification lighting, the impact on road users is not considered significant.

Other Material Assets

This chapter also reviews other material assets located within the Application Site and immediate surrounds which may have been impacted by the Project such as utilities (water, wastewater, electricity, gas), telecommunications, aviation and waste management. There is no public water supply or gas infrastructure within the Application Site. The 110kV overhead line traverses Carranstown Bog and several telecommunication links pass over the Application Site. These assets were established long after

peat extraction activities and all ancillary works commenced at the Application Site and have been able to operate successfully and uninhibited alongside Peat Extraction Phase and Current Phase activities and will continue to do so during the Remedial Phase of the Project. A scoping exercise with the Irish Aviation Authority indicates that no aviation assets are impacted by activities past, present or future at the Application Site

Since 2000, the Application Site has been operating under IPC Licence control which requires all hazardous and non-hazardous materials to be disposed of appropriately by licenced waste management operators. Likewise, details pertaining to waste (types, volume, name and address of licenced waste removal contractor, volumes recycled and reused), are recorded in AERs and submitted to the EPA annually and included in Appendix 4-3 of the rEIAR. Over the past few decades, peat extraction decreased at the Derrygreenagh Bog Group (of which the Ballivor Bog Group is a subset and in which the Application Site is located) and consequently the volume of waste produced has also decreased. This fall in waste production has and will continue to fall during the Current Phase and Remedial Phases due to limited activities occurring at the Application Site.

1.15 Major Accidents and Natural Disasters

Chapter 15 of the EIAR describes the likely significant adverse effects on the environment arising from the vulnerability of the Project to risks of major accidents and/or natural disasters, as well as the potential of the Project itself to cause potential major accidents and/or natural disasters.

The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, ornithology, land, soils & geology, water, air quality, climate, material assets, cultural heritage and the landscape. A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

The key Major Accident and/or Disaster scenarios were identified for each phase and a risk assessment for each scenario was conducted. All scenarios identified for each of the three phases were determined to be low risk scenarios. The risk assessment assumes that all proposed mitigation measures and safety procedures have failed. The potential for Major Accidents or Disasters has reduced since peat extraction ceased in 2020 and reduced further when the last volumes of peat were transported offsite in 2023. The potential for a Major Accident or Disaster during the Remedial Phase is very low and the residual impact is determined to be imperceptible during this phase. Finaly there was no potential for significant cumulative or in combination impact with other plans or projects identified during each of the three phases.

1.16 Interactions of the Foregoing

Chapters 5 to 15 of the rEIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (including Ornithology), Land, Soils and Geology, Hydrology and Hydrogeology, Air Quality, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage, Material Assets, and Major Accidents and Natural Disasters, as a result of the Peat Extraction Phase, Current Phase and Remedial Phase of the Project. All of the potential significant effects of the of these phases and the measures used and proposed to mitigate them have been outlined in the main rEIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect. A matrix is presented in Chapter 16 of the rEIAR to identify interactions between the various aspects of the environment already discussed in the rEIAR. The matrix highlights the occurrence of

potential positive or negative residual effects taking control and mitigation measures into account, during the Peat Extraction, Current and Remedial Phases of the Project at the Application Site.

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1. INTRODUCTION

1.1 Introduction

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared by MKO on behalf of Bord na Móna Energy Ltd. a subsidiary of Bord na Móna plc. (hereafter 'the Applicant'), as part of an application for substitute consent for peat extraction and all peat extraction related activities from July 1988 to the present day that have been carried out within the Ballivor Bog Group (namely Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs, which are hereafter referred to as the 'Application Site'), located in Counties Meath and Westmeath. Section 177E of the Planning and Development Act 2000, as amended, permits an application to be made for substitute consent in respect of development which has been carried out where an Environmental Impact Assessment (EIA), screening for EIA and/or Appropriate Assessment (AA) was or is required.

Neither the European Union Council Directive 85/337/EEC of 27th June 1985 on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the 'EIA Directive') nor the European Union Council Directive 92/43/EEC of 21st May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the 'Habitats Directive') has retrospective effect; neither Directive imposes legal requirements to have carried out prior assessments of projects which had already commenced or been completed. There was, therefore, no legal requirement for EIA, screening for EIA or Appropriate Assessment in respect of any project prior to the latest dates for transposition of the Directives. In the case of the EIA Directive, the latest date for transposition was 3rd July 1988. In the case of the Habitats Directive, the latest date for transposition was 10th June 1994.

The application for substitute consent is seeking consent for development which took place from July 1988,[1] the timeframe for when the EIA Directive was required to be transposed into Irish Law, to present day.

This rEIAR provides a description of:

i. The activities employed at the Application Site from 1948 at the onset of preparation works up to July 1988.
ii. **A description of the baseline environment as of July 1988.**
iii. **A description of peat extraction and related activities at the Application Site from July 1988 to the cessation of peat extraction in June of 2020.**
iv. **A description of the management of the Application Site since June 2020; and,**
v. **A description of the activities intended to be carried out at the Application Site into the future.**

Under Article 1(2) of the EIA Directive, 'project' means:

> *"-the execution of construction works or of other installations or schemes, other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources."*

For the purposes of this rEIAR, the items outlined in **bold** above outline the 'Project', the effects on the environment of which, if any, will be examined in this rEIAR. The Project formed part of an overall development at the Application Site which commenced many years prior to July 1988. As such, to facilitate as complete an assessment as is possible of the project since July 1988, a description of the

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

development pre-1988 is included in this rEIAR (see Section 4.3 in Chapter 4 of this rEIAR). This rEIAR and substitute consent application is made to An Bord Pleanála (hereafter referred to as 'the Board' or 'ABP' as appropriate throughout this rEIAR) as prescribed under Part XA 177F of the Planning and Development Act 2000 (as amended). It is accompanied by a remedial Natura Impact Statement (rNIS).

Industrial scale peat extraction was permanently ceased by the Applicant at the Application Site in June 2020. From June 2020 until the end of 2023, all remaining stockpiled peat was systematically removed from the Application Site. The Applicant's statutory duties to discharge the conditions of its Integrated Pollution Control Licence (IPC) Licence (Ref. P0501-01; "IPC Licence" hereafter), from the Environmental Protection Agency for the Derrygreenagh Bog Group, which encompasses the Ballivor Bog Group and thus the Application Site, also remain on-going. These ongoing duties, such as environmental monitoring, do not facilitate the continuation of peat extraction, but rather ensure compliance with the Applicant's extant EPA Licence.

1.1.1 References to Project Phases

For the purposes of this rEIAR, the Project is defined under three different timeframes termed 'phases':

- **'Peat Extraction Phase':** peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June of 2020 (July 1988 – June 2020). The Peat Extraction Phase is described in detail in Sections 4.4 to Section 4.7 of Chapter 4.
- **'Current Phase':** the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in Section 4.8 of Chapter 4.
- **'Remedial Phase':** the activities intended to be carried out at the Application Site into the future. The Remedial Phase is described in detail in Section 4.9. of Chapter 4.

1.2 Legislative Context

Prior to the 20th of September 2012, all industrial scale peat extraction activities were classified as exempted development. The Environment (Miscellaneous Provisions) Act 2011 came into effect on the 20th of September 2012 which inserted Section 4(4) to the Act. Section 4(4) legislates that development which is typically exempt (e.g. industrial peat extraction pre-2012) is no longer exempt if an EIA or an AA of the development is required. Notwithstanding this provision, the legal planning status of commercial peat extraction remained uncertain and unclear in practice up until September 2019, as described below.

The Planning & Development (Amendment) Act 2010 introduced Part XA – Substitute Consent to the legislation. Procedural details on substitute consent applications were inserted by Article 26 of S.I. No. 476/2011 – Planning and Development (Amendment) (No. 3) Regulations 2011.

Substitute consent is the statutory planning application process to allow for regularisation of historical development of land that would require EIA if that development were to be the subject of a planning application under current legislation. The substitute consent process also provides for circumstances where an EIA, a determination as to whether an environmental impact assessment is required, or an appropriate assessment, was or is required and has not been carried out. The local authority can serve a notice on the developer requiring an application for substitute consent to be made to the Board.

Alternatively, in circumstances where a notice has not been served by the local authority the developer may opt to make an application for substitute consent to the Board. It is this alternative circumstance that is applicable to this application.

Sections 6, 7 and 8 of the Planning and Development, and Residential Tenancies, Act 2020 and the Planning and Development (Amendment) (No. 2) Regulations 2020 introduced changes to the substitute consent procedure in response to the Supreme Court judgment issued on 1st July 2020 in the "Ballysax/McQuaid" cases - three joined appeal cases relating to two quarries (*An Taisce v An Bord Pleanála*, An *Taisce v An Bord Pleanála,* and *Sweetman v An Bord Pleanála* [2020] IESC 39). This judgment, delivered by Mr. Justice McKechnie, found that certain provisions of the substitute consent system in the Planning and Development Act 2000 (as amended) were inconsistent with the provisions of Directive 2011/92/EU, as amended by Directive 2014/52/EU in terms of requiring exceptional circumstances and public participation.

Section 8 of the Planning and Development, and Residential Tenancies, Act 2020 amends section 177K of the Planning and Development Act 2000 (as amended) under a new subsection (1A) whereby the Board is precluded from granting substitute consent unless it is satisfied that exceptional circumstances exist that would justify the grant of such consent. Section 177(D)(2) of the Planning and Development Act 2000 (as amended) outlines the matters to be considered by the Board in determining whether "exceptional circumstances" exist.

In October 2021, the Applicant submitted an application to the Board (ABP Ref. LS17.311646) for leave to apply for substitute consent under Section 177E of the Planning and Development Act 2000 (as amended) for peat extraction and related activities at the Application Site. In accordance with the specific amendments proposed to the substitute consent process in the Planning and Development, Maritime and Valuation (Amendment) Act 2022, (which were commenced on the 16th of December 2023 by Ministerial Order S.I. 645,) any such application for leave to apply for substitute consent which had not been determined by the Board before that commencement date shall be deemed to have been withdrawn by the Applicant. As such, the application for leave (ABP Ref. LS17.311646) which was submitted to the Board was withdrawn in January 2024.

This rEIAR is accompanied by an application to the Board for substitute consent, as prescribed under Part XA 177F of the Planning and Development Act 2000 (as amended):

> ***"Section 177F.***— *(1) A F858 [remedial environmental impact assessment report] shall contain the following: (a) a statement of the significant effects, if any, on the environment, which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out; (b) details of— (i) any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment; n(ii) the period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant; (c) such information as may be prescribed under section 177N."*

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), has been transposed into Irish planning legislation through the amendment of the Planning and Development Act 2000 and the Planning and Development Regulations 2001. Directive 2011/92/EU was amended by Directive 2014/52/EU which has been transposed into Irish law under European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018), amending the Planning and Development Act, 2000 and the Planning and Development Regulations 2001.

This rEIAR complies with the EIA Directive as amended by Directive 2014/52/EU, the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations (as amended).

An Environmental Impact Assessment (EIA) of the Project will be undertaken by the Board as part of their consideration of the application for planning permission for the Project.

Article 5 of the EIA Directive provides where an EIA is required, the developer shall prepare and submit a remedial environmental impact assessment report (rEIAR). The information to be provided by the developer shall include at least:

a) *a description of the project comprising information on the site, design, size and other relevant features of the project;*
b) *a description of the likely significant effects of the project on the environment;*
c) *a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
d) *a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
e) *a non-technical summary of the information referred to in points (a) to (d); and*
f) *any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.*

In addition, Annex IV of the EIA Directive provides further detail on the information to be included in an EIAR. These requirements are transposed under Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended), with which this EIAR complies. In addition, Part 19, Article 222A of the Planning and Development Regulations 2001 (as amended) sets out the information to be contained in an rEIAR. MKO was appointed as environmental consultant on the Project and commissioned to prepare this rEIAR in accordance with the requirements of the EIA Directive.

1.3 The Applicant

Bord na Móna plc. and its subsidiaries is an Irish, semi-state climate solutions company helping lead Ireland towards a climate neutral future. Bord na Móna has been serving communities for over 90 years, always rising to meet the needs of the day. It was founded in 1934 as The Turf Development Board to enhance national energy security through peat harvesting and became Bord na Móna in 1946.

The functions of Bord na Móna as set out under Section 17(1) of the 1946 Act were:

"(a) to produce and market turf and turf products, and
(b) to foster the production and use of turf and turf products, and
(c) to acquire bogs and other lands, and
(d) to manage, develop and work bogs and other lands vested in the Board, and
(e) generally to do all such other things as arise out of, or are consequential upon, the duties mentioned in the preceding paragraphs of this section."

Today, the company has radically changed its approach to face an even greater challenge: climate change. Bord na Móna have ended peat harvesting and now focus on developing climate solutions in renewable energy, sustainable waste management, carbon storage, and biodiversity conservation. Ireland has committed to ambitious climate goals and Bord na Móna's climate solutions are helping to achieve them. Bord na Móna's vision is to help Ireland reach net zero greenhouse gas emissions by 2050.

To power a net zero future, Bord na Móna are expanding its renewable energy infrastructure. Although they have been constructing and maintaining large-scale infrastructure for decades, the company is now using that experience to build renewable energy developments across the country. These developments are transforming the way the nation generates and consumes energy. Ireland has committed to generating 80% of electricity from renewable sources by 2030 and Bord na Móna is working across

wind, solar, biomass and biogas to help achieve this target and to provide energy security for future generations.

Bord na Móna currently provides employment for approximately 1,500 people and manages a land holding of over 80,000 hectares located mainly in the Irish midlands. At their peak, employment numbers exceeded 7,400 in the early 1960s, with the workforce dropping to approximately 2,000 by the late 1990s.

In April 2023, Bord na Móna Powergen Ltd., a subsidiary of Bord na Móna Plc., lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarmplanning.ie/). This application was made directly to An Bord Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Planning and Development Act 2000 (as amended). This position was confirmed by An Bord Pleanála in correspondence to the Applicant dated 5th April 2022 following pre-application consultations with the Board under Section 37B of the Act (ABP-307471-20). The proposed wind farm will be cumulatively assessed with the rehabilitation plans for the Ballivor Bog Group in this rEIAR.

1.4 Project Description

Substitute consent is being sought by the Applicant of their own volition to regularise, without prejudice, the planning status of the Application Site to facilitate appropriate future uses of these lands in compliance with the requirements of the planning system. Substitute consent is being sought for the relevant peat extraction activities and all ancillary works that were undertaken at the Application Site from 1988 onwards, including the following:

i. *Installation of surface water drainage infrastructure at Ballivor Bog Group, specifically at Ballivor, Carranstown, Bracklin, Lisclogher, and Lisclogher West Bogs to facilitate peat extraction activity from 1988 to June 2020;*
ii. *Vegetation clearance to facilitate peat extraction activity from 1988 to June 2020;*
iii. *Industrial scale peat extraction (milled peat and sod peat/moss), specifically at Ballivor, Carranstown, Bracklin, and Lisclogher Bogs from 1988 to June 2020;*
iv. *Use and maintenance of pre-existing ancillary supporting infrastructure and services to facilitate peat extraction and associated activities (e.g., railway infrastructure, fixed fuel tanks, drainage (drains, silt ponds, pumps), machine passes etc.), from 1988 to present day;*
v. *Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0501-01) which commenced from April 2000 onwards to the present day;*
vi. *All associated site development and ancillary works.*

These peat extraction activities and all ancillary works are referred to as the 'Project' as appropriate. A full description of the Project is included in Chapter 4: Description of the Development.

1.5 Background to the Application

Bord na Móna is a semi-state company which was established from the Turf Development Board Ltd. following the commencement of the Turf Development Act 1946, with the aim of developing national peat resources and thereby providing security of energy supply and economic benefit for Irish communities. Under Bord na Móna's Second Development Programme, drainage works, buildings and railway networks were established at the Application Site from 1948, with the commencement of peat extraction activities in 1953 in the main Ballivor Bog area. Clearance and drainage work commenced in Bracklin Bog in 1950 and peat extraction commenced there in 1957. Clearance and drainage of Lisclogher Bog began in 1950, with peat extraction commencing in 1960. Annual reports indicate that peat extraction was already underway at Ballivor, Bracklin (main area) and Lisclogher by the 1960s.

The earliest aerial mapping available (1973) confirms that by this period, drains were already inserted at Ballivor, Bracklin and Lisclogher Bogs. Aerial imagery from 1988 indicates that Carranstown Bog and the western portion of Bracklin Bog were subject to peat extraction prior to 1988. Drainage works were completed at Lisclogher West Bog after 1988; however, no extraction of peat was undertaken in this bog. In 1983 Bord na Móna was granted planning permission to erect bulk loading facilities for moss peat at Ballivor Bog (Planning Ref: 323/83) and this facility opened in 1985. The majority of the extracted material at the Application Site was supplied to the horticultural sector.

Industrial-scale peat extraction ceased at the Application Site in June 2020, and the Applicant formally announced in January 2021 that peat extraction across all its land holdings would permanently cease. With the cessation of peat extraction, the former peat production fields will be able to naturally revegetate and evidence for this is already noticed in Lisclogher Bog and large parts of Bracklin Bog. However, full revegetation will likely take some time and measures to aid the site rehabilitation are outlined in the bog specific Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans (refer to Appendix 4-2).

The latest dates for the transposition of the EIA and Habitats Directives were 3rd July 1988 and 10th June 1994 respectively. These Directives do not purport to have retrospective effect, i.e., neither the EIA Directive nor the Habitats Directive apply to works undertaken prior to 1988 and 1994 respectively. As such, substitute consent is being sought to regularise the planning status of the Application Site for the period 1988 to the present day. This application is being made strictly without prejudice to the fact that the development benefitted from exempted development status for part of the period covered by this application.

1.5.1 Site Location

The Application Site comprises five bogs located at the Westmeath-Meath County border. The bogs include Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher-West Bogs and comprise an area of 2,421 hectares (ha) within which bog drainage works began in 1948 followed by the commencement of peat extraction from 1953 to 2020. The Application Site is located 2.5 km south-southeast of Delvin, 3.7km east of Raharney and 2.2km west of Ballivor Village. The Application Site location is shown on Figure 1-1 and Figure 1-2. The Application Site extends across several townlands which are listed below in Table 1-1. The Application Site measures approximately 9.27km in length from north to south, and approximately 7.0 kilometres from east to west, at its widest point. Grid Reference co-ordinates for the approximate site centre are E263560, N257213. Under the Water Framework Directive (WFD; Directive 2000/60/EC), the site is located within the Boyne_SC_040 and Boyne_SC_050 sub catchments and the Boyne (Catchment ID 07).

The current main access points to the Application Site include a northern and southern entrance off the R156 Regional Road into Carranstown Bog and Ballivor Bog, respectively. Access to the remaining bogs is possible through Carranstown Bog and via local roads off the N52, N51 and N4 such as the L4106, L4101.

Table 1-1 Townlands within which the Application Site is located.

Bog Reference	County	Townlands - Meath	Townlands - Westmeath	Spatial Footprint (ha)
Ballivor	Meath / Westmeath	Clondalee More, Derryconor, Clonycavan, Robinstown Killaconnigan	Grange More, Riverdale	638
Bracklin (including Hill of Downey)	Westmeath	N/A	Craddanstown, Bracklin, Killagh, Ballynaskeagh (Ballynaskeagh E.D.), Mucklin	772
Carranstown	Meath / Westmeath	Killaconnigan, Carranstown Little, Carranstown Great	Grange More	304

Bog Reference	County	Townlands - Meath	Townlands - Westmeath	Spatial Footprint (ha)
Lisclogher	Meath / Westmeath	Coolronan	Lisclogher Great, Cockstown, Clonleame, Bracklin Clonmorrill	479
Lisclogher West	Westmeath	N/A	Bracklin, Ballyhealy or Ballinure, Bolandstown, Martinstown (Ballyhealy E.D).	228
Total Spatial Footprint: 2,421 ha				

1.5.2 Site Context

The landcover within the Application Site comprises a mix of bare cutaway peat, re-vegetated peat, degraded blanket bog, scrub, low woodland and remnants of high bog. Today, the topography of the Application Site ranges between 86 m above ordnance datum (m OD) at its highest point to 69m OD at its lowest point.

Ballivor Bog has a total area of 638ha, with 82ha therein subject to peat extraction at the point of cessation in June 2020. The bog is currently drained by a series of northwest-southeast orientated drains spaced at approximately 15m intervals. The topography within this bog today ranges from approx. 70 – 79mOD. Bare peat dominates the northeast, east and southeast of the bog. A mix of heath, scrub and pioneer open cutaway habitats can be found in the west, south and in small pockets to the northeast. Pockets of woodland are also found to the southwest.

Carranstown Bog has a total area of 304ha, with 178ha therein subject to peat extraction at the point of cessation in June 2020. The bog predominantly consists of bare peat heath habitat along the western boundary and covering large portions of the east. Scrub, woodland and raised bog remnants can be found in the east also with a small area of fen to the northeast. The topography within this bog today ranges from approx. 68 – 75mOD.

Bracklin Bog has a total area of 772ha, incorporating the Hill of Down area, with 118ha therein subject to peat extraction at the point of cessation in June 2020. Peat extraction was concentrated in a small section in the west of the bog, referred to as Bracklin West. As such, this bog predominantly comprises bare peat habitat. The bog is drained by a series of northeast-southwest orientated drains. As the main part of Bracklin Bog went out of operation in the 1990s, it now comprises heath, scrub, areas of cutover bog, and pioneer open cutaway habitats and pockets of wetlands. The topography within this bog today ranges from approx. 71 – 86mOD.

Lisclogher Bog has a total area of 479ha. Peat extraction ceased across large areas of this bog in 2003 and regeneration is evident throughout. Third party extraction on limited areas continued until June 2020. Areas of remnant bog are located in the north and south of the bog. Pioneer open cutaway habitats dominate in the centre of the bog along with heat, scrub, wetland areas and woodland. The topography of this bog today ranges from approx. 69 – 76mOD. It is drained by a series of east-west orientated drains.

Lisclogher-West Bog has a total area of 228ha and while drainage was inserted, this was never subject to peat extraction. The existing high bog is relatively dry and is drained by a series of northwest-southeast orientated drains. The topography of this bog today ranges from approx. 77 – 82mOD. The bog comprises degraded raised bog, bog woodland and heathland mosaic, scrub and conifer plantation.

Onsite infrastructure still present and functional across the Application Site today includes:

- Surface water drainage system including silt ponds and drainage channels;

- De-mountable rail network including rail lines, at grade rail crossings and ancillary infrastructure;
- Electricity distribution infrastructure;
- Machine passes and site access points; and,
- Guyed wind monitoring mast.

The Ballivor Works (hereafter 'the Works'), which comprises the former peat processing plant, storage facilities, canteen and welfare facilities, tippler, bulk loading facility and former workshop is located adjacent to the Application Site boundary.

The landcover and uses surrounding the Application Site comprises a mixture of forestry, agricultural land, cutover and cutaway peatland, one-off rural housing and small village settlements. Cutaway peatlands are those areas where all commercially viable volumes of peat have been extracted. Cutover peatlands are those areas where peat extraction has occurred, and commercially viable peat volumes remain. The consented Bracklyn Wind Farm (ABP Ref. PA25M.311565) site is located adjacent to the northwestern boundary of the Application Site.

Peat extraction ceased at the Application Site in June 2020. Please see Figure 1-3 for peat production areas in 1988. As part of the decommissioning process, the process of transporting remaining peat stockpiles off the bogs commenced following the cessation of peat extraction in June 2020. The stockpiles were transported to Kilberry Horticulture, Edenderry Power Station and Derrinlough Briquette Factory. The final stockpiles were transported off the bogs in 2023.

With the establishment of the Turf Development Act of 1981 (which amended and extended the rights of the Turf Development Act 1946-1980), Bord na Móna oversaw a private turf development scheme which provided grants to private bog developers. At the Application Site, third party sod peat extraction was limited to Lisclogher Bog from the 1990s until June 2020. Please see Figure 1-5 for third party peat extraction locations.

Delvin

Lisclogher West Bog

Lisclogher Bog

Bracklin Bog

Carranstown Bog

Ballivor Bog

Killucan

Ballivor

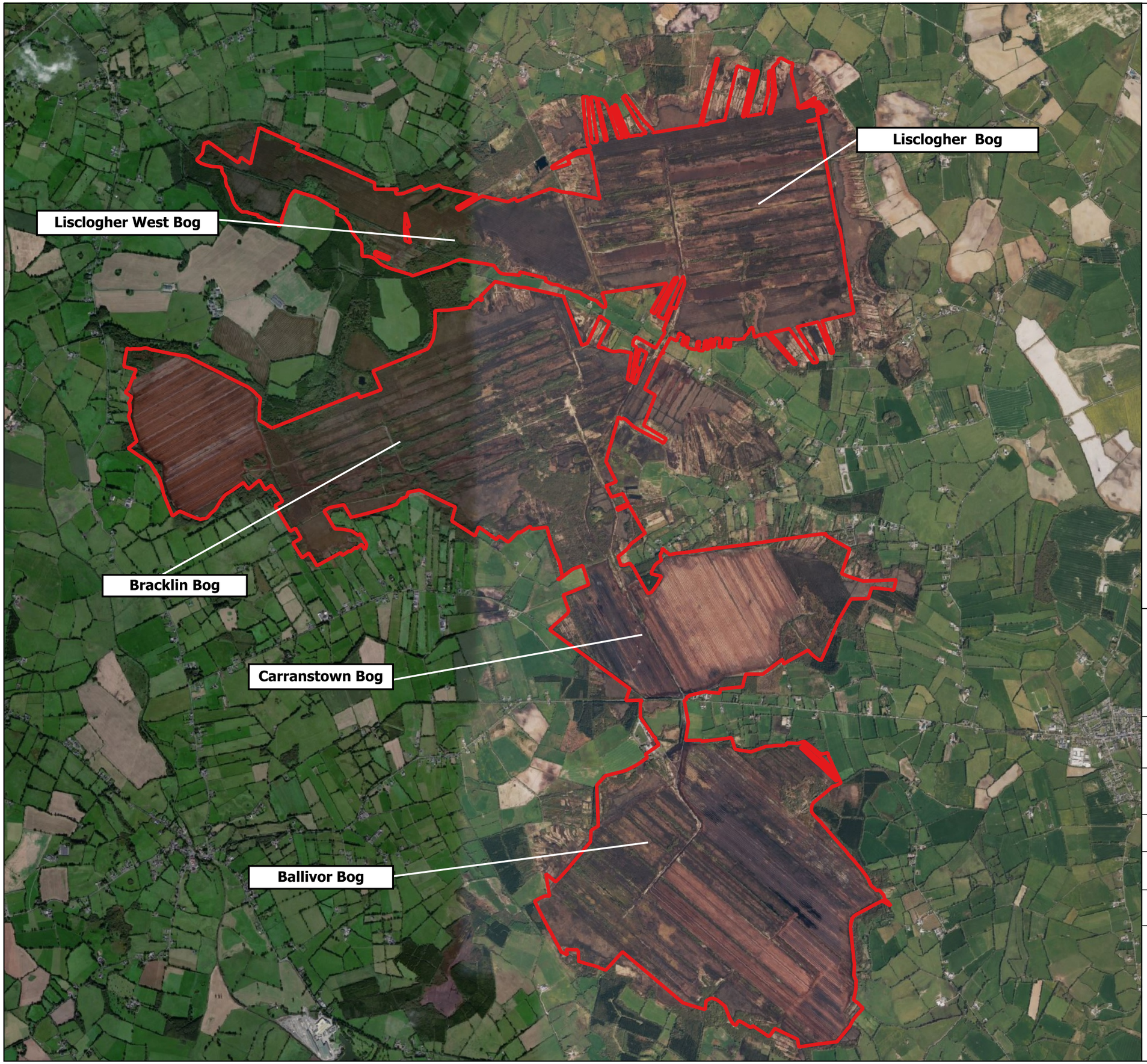
Map Legend

Application Site Boundary

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Drawing Title: Site Location	
Project Title: Ballivor Substitute Consent Application	
Drawn By: NS	Checked By: EC
Project No.: 191137f	Drawing No.: Figure 1-1
Scale: 1:80,000	Date: 2024-06-26

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Map Legend

Application Site Boundary

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Drawing Title
Site Location

Project Title
Ballivor Substitute Consent Application

Drawn By	Checked By
NS	EC
Project No. 191137f	Drawing No. Figure 1-2
Scale 1:35,000	Date 2024-06-26

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N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

- Application Boundary

1988 Peat Production

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

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
1988 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	
BNM-PG-20-01-26_v4	1:30,000	JG	09/07/2024	Fig. 1-3

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N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

Application Boundary

2020 Peat Production

Drained - Not Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
2020 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	
BNM-PG-20-01-29_v3	1:30,000	JG	09/07/2024	Fig. 1-4

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Figure 1-5 Lisclogher Third Party Peat Extraction Locations-



1.6 Purpose and Scope of the rEIAR

The purpose of this rEIAR is to document the current state of the environment in the vicinity of the Application Site and to assess, in accordance with the requirements of the EIA Directive, the likely significant effects which have occurred, or which are occurring, or which can reasonably be expected to occur on the environment due to peat extraction activities and all ancillary works at the Application Site. The scope of the impact assessment is peat extraction activities and all ancillary works from July 1988 to the present day.

It is important to distinguish the remedial Environmental Impact Assessment (rEIA) to be carried out by the Board, from this rEIAR which is accompanying the substitute consent application. The rEIA is the assessment carried out by the competent authority, which includes an examination that identifies, describes and assesses in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11 of the 2011 EIA Directive (2011/92/EU as amended by 2014/52/EU), the direct and indirect effects of the Development on the following:

a) *Population and human health*
b) *Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC*
c) *Land, soil, water, air, and climate*
d) *Material assets, cultural heritage and the landscape*
e) *The interaction between the factors referred to in points (a) to (d)*

This rEIAR submitted by the Applicant provides the relevant environmental information to enable the rEIA to be carried out by the competent authorities. The information to be contained in the rEIAR is prescribed in Article 5 and Annex IV of the revised EIA Directive and Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) described in Section 1.2 above.

1.7 Structure and Content of the rEIAR

1.7.1 General Structure

This rEIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Project thereon and the proposed mitigation measures. Background information relating to the Project, scoping and consultation undertaken and a description of the Project are presented in separate sections. The grouped format sections describe the impacts of the Project in terms of population and human health, biodiversity, with specific attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EEC; land, soils and geology, water, air quality, climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing, schedule of mitigation and monitoring, and risk of major accidents and vulnerability to disasters.

The chapters of this rEIAR are included in Volume 1 of this rEIAR, and are as follows:

1. *Introduction*
2. *Background to the Development*
3. *Consideration of Reasonable Alternatives*
4. *Description of the Development*
5. *Population and Human Health*
6. *Biodiversity (including Ornithology)*
7. *Land, Soils and Geology*
8. *Hydrology and Hydrogeology*
9. *Air Quality*

10. *Climate*
11. *Noise and Vibration*
12. *Landscape and Visual*
13. *Archaeological, Architectural and Cultural Heritage*
14. *Material Assets (including Traffic and Transport)*
15. *Vulnerability to Major Accidents and Natural Disasters*
16. *Interactions of the Foregoing*
17. *Schedule of Mitigation and Monitoring Measures*

The rEIAR also includes a Non-Technical Summary (NTS), which is a condensed and easily comprehensible version of the rEIAR document. The NTS is laid out in a similar format to the main rEIAR document and comprises a description of the Project (as part of the Development) followed by the existing environment, impacts and mitigation measures presented in the grouped format.

Appendices to the chapters listed above are included in Volume 2 of this rEIAR.

1.7.2 Description of Likely Significant Effects and Impacts

As stated in the *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022), an assessment of the likely impacts of a project is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

The classification of impacts in this rEIAR follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the European Commission (EC) and the Environmental Protection Agency (EPA):

- *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022)*;
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Local Government and Heritage, 2018)*; and,
- *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (EC, 2017).

Table 1-2 below, presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a project on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the rEIA employs a systematic approach, which can be replicated across all disciplines covered in the rEIAR. The consistent application of terminology throughout the rEIAR facilitates the assessment of the impacts on the receiving environment.

Each impact is described in terms of its quality, significance, duration and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the rEIAR. Residual impacts are also presented following any impact for which control measures are prescribed. The remaining impact types are presented as required or applicable throughout the rEIAR. Any potential interactions between the various aspects of the environment assessed throughout this rEIAR are presented in Chapter 16: Interaction of the Foregoing.

Table 1-2 Impact Classification Terminology (EPA, 2022)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent and Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented

Impact Characteristic	Term	Description
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should the subject project not be carried out
	Worst Case'	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

1.8 Project Team

1.8.1 Project Team Responsibilities

The companies and staff listed in Table 1-3 rEIAR Project Team were responsible for completion of the rEIAR. Further details regarding project team members are provided below.

The rEIAR project team comprises a multidisciplinary team of experts with extensive experience in environmental impact assessment in their relevant area of expertise. The qualifications and experience of the principal staff from each company involved in the preparation of this rEIAR are summarised in Section 1.8.2 below. Each chapter of this rEIAR has been prepared by a competent expert in the subject matter. Further details on project team expertise are provided in the Statement of Authority at the beginning of each impact assessment chapter.

Table 1-3 rEIAR Project Team

Consultants	Principal Staff Involved in Project	rEIAR Input
MKO Tuam Road, Galway.	Michael Watson Sean Creedon Ellen Costello Karen Mulryan Grainne Griffin Natalia Stolarska John Willoughby Tommy Harlin Padraig Cregg Pat Roberts John Hynes Sarah Mullen Padraig Desmond Patrick Manley Ian Hynes Jack Workman Killian Devereux Aoife Joyce	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement and the following Chapters: › 1. Introduction › 2. Background to the Development › 3. Consideration of Reasonable Alternatives › 4. Description of the Development › 5. Population and Human Health › 6. Biodiversity (including Ornithology) › 12. Landscape and Visual › 14. Material Assets (including Traffic and Transport) › 15. Vulnerability to Major Accidents and Natural Disasters › 16. Interaction of the Foregoing › 17. Schedule of Mitigation and Monitoring Measures
Hydro Environmental Services 22 Lower Main Street, Dungarvan, Co. Waterford.	Michael Gill Conor McGettigan	Flood Risk Assessment, Drainage Assessment and Preparation of the following Chapters: › 7. Land, Soils and Geology › 8. Hydrology and Hydrogeology

Consultants	Principal Staff Involved in Project	rEIAR Input
AWN Consulting The Tecpro Building, Clonsgaugh Business & Technology Park, Dublin 17.	Ciara Nolan Mike Simms Dermot Blunnie	Preparation of : › 9. Air Quality › 10. Climate › 11. Noise and Vibration
Tobar Archaeological Services Saleen Midleton Co. Cork.	Miriam Carroll Annette Quinn	Preparation of › 13. Archaeological, Architectural and Cultural Heritage

1.8.2 Project Team Members

MKO

Michael Watson, MA; CEnv PGeo

Michael Watson is Environmental Director at MKO, overseeing a team which comprises over 50 highly skilled environmental professionals. Michael has over 20 years' experience in the environmental sector. Following the completion of his Master's Degree in Environmental Resource Management, Geography, from National University of Ireland, Maynooth he worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael's professional experience includes managing Environmental Impact Assessments, EPA License applications, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the renewables, waste management, public sector, commercial and industrial sectors nationally. Michaels key strengths include project strategy advice for a wide range and scale of projects, project management and liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams. Michael is a key member of the MKO senior management team and as head of the Environment Team has responsibilities to mentor various grades of team members, foster a positive and promote continuous professional development for employees. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo).

Sean Creedon, BSc, MSc

Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Prior to joining MKO Sean fulfilled several project and program management roles within Bord na Mona. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

Ellen Costello BSc, MSc

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

Gráinne Griffin BSc, MSc

Gráinne is an Environmental Scientist with MKO with over 2 years' experience in the environmental consultancy sector, which included ecological roles as a marine mammal observer and an aerial survey

operator. Gráinne holds a BSc in Applied Freshwater & Marine Biology from ATU Galway and a MSc in Environmental Leadership from the University of Galway. Gráinne's key strengths and areas of expertise include managing and researching reports in areas of environmental conservation and policy, ecology, renewable energy, marine spatial planning, and climate action. Gráinne has experience in report writing, including Appropriate Assessments, Natura Impact Statements, feasibility studies and EIA screening reports. Gráinne also holds skills in environmental restoration project research and design. Since joining MKO Gráinne has been involved in coordinating environmental site work for a wide range of developments, assisting in stakeholder engagement, scoping exercises, organising and attending pre-application meetings with local authorities and An Bord Pleanála. Within MKO, Gráinne has been assisting managers in the coordination and production of EIARs for largescale SID wind energy developments. Gráinne also holds a membership with the Chartered Institute of Ecology and Environmental Management (CIEEM).

Natalia Stolarska BSc, MSc

Natalia Stolarska is a Graduate Environmental Scientist with MKO. Natalia holds a BSc in Earth and Ocean Science and an MSc in Environmental Leadership. Natalia's key strengths and areas of expertise are in drafting EIAR report chapters, environmental impact assessment screening reports, wind farm feasibility studies and QGIS mapping. Since joining MKO in September 2023, Natalia has been involved as a Graduate Environmental Scientist in a range of wind farm projects, assisting with field work, client briefing notes, constraints mapping and drafting EIAR chapters, with more projects in the pipeline.

Pat Roberts B.Sc. (Env.) CIEEM

Pat Roberts is Principal Ecologist with MKO with over 18 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc.(Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Prior to taking up his position with MKO in June 2005, Pat worked in Ireland, USA and UK as a Tree Surgeon and as a nature conservation warden with the National Trust (UK) and the US National Park Service. Pats key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He is currently responsible for staff development, training and ensuring that the outputs from the ecology team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM).

Sarah Mullen B.Sc. M.Sc Ph.D.

Sarah is a Project Director (Ecology) with MKO with over 7 years' experience in ecological consultancy. Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany. Prior to taking up her position with MKO in September 2018, Sarah worked as an Ecologist with Ryan Hanley Ltd. where she gained experience in multidisciplinary ecological surveys, ecological impact assessment and appropriate assessment. Since joining MKO Sarah has been responsible for the management, co-ordination and undertaking of flora, fauna and habitat surveys for a range of projects including large-scale energy infrastructure projects, residential and commercial developments, tourism projects and biodiversity monitoring and restoration projects. She has overseen the preparation of ecological reports to accompany planning applications including Ecological Impact

Assessments, Stage 1 and Stage 2 Appropriate Assessment reports, Invasive Species Management Plans and Biodiversity/Habitat Management Plans. She currently oversees the general Ecology team at MKO. Sarah's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. She holds membership with the Chartered Institute of Ecology and Environmental Management.

Padraig Desmond B.Sc (Hons)

Pádraig is a Project Ecologist with MKO with 4 years post graduate ecological experience and over 3 years of which have been in ecological consultancy. Pádraig holds a BSc (Hons) in Ecology and Environmental Biology from University College Cork. Pádraig took up his position with MKO in December 2021, prior to which he worked as a Junior Ecologist with Envirico. Through these consultancy roles Pádraig has gained excellent experience in producing ecological reports such as Natura Impact Statements, Ecological Impact Assessments, Biodiversity chapters, Invasive Species Management Plans, and Constraints Reports for a wide range of projects including small private developments to housing developments and renewable energy projects such as solar and wind farms. Prior to the above roles, Pádraig worked as a field ecologist for the Department of Conservation in New Zealand, where he developed a strong field-based skill set.

Pádraigs key strengths and areas of expertise are in terrestrial ecology, including vegetation surveys, habitat identification, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. Pádraig is also skilled in GIS.

Patrick Manley B.Sc

Patrick Manley is a Senior Ornithologist with MKO with over 7 years of experience in environmental consultancy. Patrick holds BSc (Hons) in Geology from University College Dublin. Since joining MKO, Patrick has worked on wind farm projects, solar farm projects, residential developments, data centres, county council projects and National Parks and Wildlife Service projects. He specialises in ornithological consulting, including Environmental Impact Assessments and has specialist knowledge in designing, executing and project managing ornithological assessments, primarily in the renewable industry. Prior to joining MKO in August 2016, Patrick gained experience through his involvement in several bird conservation projects, including protected curlew, seabirds and waders. Within MKO, Patrick plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIAR chapters.

John Willoughby BA (Hons) M.Sc (Hons)

John is a Project Planner in MKO with over 7 years' experience across planning consultancy and environmental management. John holds a BA (Hons) in Geography, Planning and Environmental Policy, and an MSc (Hons) in Environmental Policy, both from UCD, and recently completed an Advanced Diploma in Planning and Environmental Law at Kings Inns. Prior to taking up his position with MKO in 2022, John worked in planning consultancy since 2017, managing and assisting with the coordination of development projects throughout the statutory planning process, from feasibility stage to final grant and planning compliance, carrying out due diligence, feasibility assessments, development potential reports, appeals, submissions and bespoke planning advice on a wide range of development projects. John also has previous experience in environmental management in both the Pharmaceutical and Infrastructure sectors. Through both his professional and academic experience, John has gained skills in urban planning, Environmental Impact Assessment, regeneration, development management, project management, strategic planning and policy research. John is a corporate member of the IPI with specialist knowledge in national, regional and local planning policy and guidance, development management and strategic planning analysis for a wide range of projects across the residential, commercial, mixed-use, retail and renewable energy sectors. Within MKO, John works as part of a

larger multidisciplinary team to coordinate the development of planning applications for renewable energy infrastructure for submission to both Local Authorities and An Bord Pleanála.

Tommy Harlin B.Sc (Hons) M.Sc (Hons)

Tommy Harlin is a Planner with MKO having joined the company in March 2023. Tommy holds a BSc (Hons) in City Planning and Environmental Policy, and a MSc (Hons) in Urban and Regional Planning from University College Dublin where he focused his studies on renewable energy development. Tommy has experience working on a wide variety of projects ranging from small scale bespoke projects, commercial and industrial projects and large-scale renewable energy projects including onshore wind, solar, grid infrastructure, and energy storage projects. Tommy's main responsibilities to date include the preparation and lodgement of planning documentation and liaising with multidisciplinary project teams and contributing to the delivery of inputs for comprehensive planning applications. Tommy is also a graduate member of the Irish Planning Institute.

Jack Workman B.Sc M.Sc CIWEM

Jack is the Landscape & Visual Project Director at MKO and a Technician Member of the British Landscape Institute. Jack is a Landscape and Visual Impact Assessment Specialist with an academic background in the field of Environmental Science and Geography. Jack's primary role at MKO is conducting Landscape and Visual Impact Assessment (LVIA) for Environmental Impact Assessment reports, as well as supporting the MKO graphics, CAD and drone surveying teams. Jack holds a BSc. in Psychology, and an MSc. in Coastal and Marine Environments (Physical Processes, Policy & Practice) where he was awarded the Prof. Máirín De Valéra distinction in science research award. Since joining MKO in February 2020, Jack has conducted and project managed all aspects of LVIA for a broad range of commercial infrastructure developments including wind and solar energy projects, grid infrastructure, extraction industry and Strategic Housing Developments. Jack holds a membership with the Chartered Institute of Water and Environmental Management and is also a member of the Landscape Research Group.

Padraig Cregg B.Sc. (Zoo.), M.Sc. (Eco.)

Padraig is a Principal Ornithologist with MKO and has over eleven years of experience working in environmental consultancies. The natural world has been a lifelong passion for Padraig. He has pursued this passion from boyhood through his academic study and career with MKO. In his role, he acts as technical advisor for the ornithology team, helping to take projects through their entire lifecycle, from site selection through survey design, constraints studies, impact assessment and lodgement of the planning application. He is responsible for training the ornithology team and keeping his colleagues updated on all emerging guidance, legislation, policies, initiatives, industry best practices, emerging trends, and market opportunities.

John Hynes M.Sc. (Ecology), B.Sc.

John Hynes is the Ecology Director at MKO, with over 12 years' professional experience in the public and private sector. John oversees MKO's Ecology, Ornithology, Forestry, Bats, and GIS teams. John holds a B.Sc. in Environmental Science and a M.Sc. in Applied Ecology.

John's key strengths and areas of expertise are in Appropriate Assessment of plans and projects, Ecological Impact Assessment, Flora and Fauna survey methods and design, project management and project strategy. John is experienced as a coordinator or large multi-disciplinary teams on complex ecological projects. John has been involved as a lead Ecologist on a range of energy infrastructure, commercial, transport, housing, forestry, biodiversity net gain and nature restoration projects. John is a Full member of the Chartered Institute of Ecology and Environmental Management, a member of Galway County Council Climate and Biodiversity Special Policy Committee (SPC) and a contributor to the Wind Energy Ireland (WEI) Biodiversity and Sustainability Working Group.

Aoife Joyce B.Sc M.Sc.

Aoife Joyce is a Project Director (Ecology) with 5 years' professional experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training, Bat ID, Trapping and Handling and Kaleidoscope Pro Analysis. She is a graduate of Environmental Science (Hons.) at University of Galway, complemented by a first-class honours MSc in Agribioscience. Prior to taking up her position with MKO in 2019, Aoife held previous posts with Inland Fisheries Ireland and Treemetrics Ltd. She has a wide range of experience from bat roost identification, acoustic sampling, sound analysis, electrofishing, mammal and habitat surveying to GIS, soil and water sampling, Waste Acceptability Criteria testing, Environmental Impact Assessments (EIAs) and mapping techniques. Since joining MKO, Aoife has been involved in managing bat survey requirements for a variety of renewables planning applications, as well as commercial, residential and infrastructure projects. This includes scope development, project coordination, roost assessments, remote bat detector deployment, dawn and dusk bat detection surveys, bat handling, sonogram analyses, mapping, impact assessment, mitigation design inputs and report writing. Within MKO, she oversees the bat team and works as part of a wider multidisciplinary team to help in the production of ecological reports and assessments. Aoife is a member of Bat Conservation Ireland and CIEEM and holds current Bat Roost Disturbance and bat photography licenses.

Killian Devereux BSc (Hons) in Architectural Technology

Killian is currently the Project CAD Technician at MKO. He has over 8 years of drafting experience in various sectors of the building industry. He holds BSc (Hons) in Architectural Technology from Galway Mayo Institute of Technology. Prior to taking up his position with MKO in October 2022, Killian worked as a Structural CAD/BIM Technician for Tobin Consulting Engineers and as an Architectural Technician for some smaller-scale Engineering Consultants. He was primarily involved in a variety of Commercial / Residential projects where he was responsible for the structural drawing packages but also has experience working in RC concrete Drawings, Architectural and Civil drawings, FSC's /DAC's and one-off housing planning applications. His key strengths and areas of expertise are in Auto CAD, Revit, Cads RC and Google Sketch up. Since Joining MKO Killian has been the lead CAD technician on multiple Renewable Energy Planning Applications.

Hydro Environmental Services

Michael Gill

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. For example, Michael has worked on the EIARs for Oweninny WF, Cloncreen WF, and Yellow River WF, and over 120 other wind farm related projects across the country. Michael has also worked on rEIARs for Cleanrath WF, 41 no. Bord na Móna bogs, and also for a number of quarry sites. **Conor McGettigan**

Conor McGettigan

Conor McGettigan (BSc, MSc) is an Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin, graduating with a First-Class Honours degree. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin (First Class Honours). Conor has completed numerous land, soils and geology chapters for several developments on peatlands. Conor has also completed geological and hydrological studies on sensitive peatlands sites, including Clonaslee Bog, the Liffey Head Project, and Keerglen WF and Kilsallagh WF. AWN Consulting Ltd.

AWN Consulting

Mike Simms

Mike Simms (Senior Acoustic Consultant) holds a BE and MEngSc in Mechanical Engineering and is a member of the Institute of Acoustics (MIOA) and of the Institution of Engineering and Technology (MIEI). Mike has worked in the field of acoustics for over 19 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, wind energy, industrial, commercial and residential.

Dermot Blunnie

Dermot Blunnie (Senior Acoustic Consultant) holds a BEng (Hons) in Sound Engineering, MSc in Applied Acoustics and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He has been working in the field of acoustics since 2008 and is a member of the Institute of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA). He has extensive knowledge and experience in relation to commissioning noise monitoring and impact assessment of wind farms as well as a detailed knowledge of acoustic standards and proprietary noise modelling software packages. He has commissioned noise surveys and completed noise impact assessments for numerous wind farm projects within Ireland.

Ciara Nolan

Ciara Nolan (Senior Air Quality Consultant) holds a BSc (Eng) in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). Ciara has over 7 years of experience in the field of air quality consultancy. She has prepared the air quality and climate EIAR chapters for a range of developments including wind energy, industrial, pharmaceutical, data centre, residential and commercial.

Tobar Archaeological Services

Miriam Carroll is a partner of Tobar Archaeological Services which was established in 2003. Prior to that Miriam worked in the field of commercial archaeology for five years in University College Cork where she completed her primary and Masters degrees. Miriam has over 24 years of experience in the field of archaeology, with 19 of those as partner of Tobar Archaeological Services. She is a full member of the Institute of Archaeologists of Ireland (IAI) and is licensed by the National Monuments Service to carry out excavations in Ireland. Miriam undertook her primary degree in Archaeology (major) and English (minor) between 1993 and 1996. Her Masters degree was also undertaken in University College Cork. This was a 2 year course in Irish Archaeology. The subject of Miriam's thesis focused on 'Ballyalton Bowls' (prehistoric pottery) in the context of the Irish Neolithic. This Masters degree was undertaken between 1996 and 1998. Miriam then went on to work in commercial archaeology in the Archaeological Services Unit of University College Cork for 5 years after which both Annette Quinn and Miriam set up the business Tobar Archaeological Services in 2003. She is a full member of the Institute of Archaeologists of Ireland (IAI) and is licensed by the National Monuments Service to carry out excavations in Ireland. Miriam has overseen numerous commercial projects in Ireland including wind, solar and overhead line projects. Miriam was the project archaeologist for the Bandon Sewerage Scheme which lasted a number of years. This required a high-level of experience and organization as well as the resolution of parts of the 17th century town wall and other additional significant finds in a timely and efficient manner. Miriam also successfully managed a major excavation in Buttevant, Co. Cork for the Cork Education and Training board as well as being the project archaeologist for Fota Wildlife Park extension from 2014. This involved project management of a large team of archaeologists on a medieval settlement site. Miriam has also undertaken numerous EIARs and has presented evidence at numerous Oral Hearings for bodies such as Eirgrid.

1.9 Difficulties Encountered

Drainage works for peat extraction commenced at its earliest at the Application Site in the late 1940s. The retrospective impact assessments have been carried out based on the reasonable availability of information relating to the peat extraction activities and all ancillary works and the environment. In addition to references within this rEIAR, the assessments have been limited by the following:

- *While every effort has been made to source historical baseline environmental data, this rEIAR has been limited by the availability, completeness, accuracy, age and accessibility of data.*

The Methodology section of each chapter describes the approach to the impact assessment within that chapter, and where there may be data gaps, this is clearly highlighted.

1.10 Viewing and purchasing the rEIAR

Copies of this rEIAR and accompanying rNIS will be available online, including the NTS, on the website of An Bord Pleanála, under the relevant Planning Reference Number (to be assigned on lodgement of the application).

- An Bord Pleanála: http://www.pleanala.ie/

This rEIAR and all associated documentation will also be available for viewing at the offices of both An Bord Pleanála, Meath County Council and Westmeath County Council. The rEIAR may be inspected free of charge or purchased by any member of the public during normal office hours at the following address:

- An Bord Pleanála,
  64 Marlborough Street,
  St. Rotunda,
  Dublin 1,
  D01 V902.

- Meath County Council,
  Buvinda House,
  Dublin Road,
  Navan, Co. Meath,
  C15 Y291.

- Westmeath County Council,
  Áras An Chontae,
  Mount St,
  Mullingar,
  Co. Westmeath,
  N91 FH4N.

The rEIAR and rNIS will also be available to view online via the Department of Planning, Housing and Local Government's EIA Portal, which will provide a link to the planning authority's website on which the application details are contained. This EIA Portal was recently set up by the Department as an electronic notification to the public of requests for development consent which are accompanied by an EIAR.
https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

2. BACKGROUND

This section of the remedial Environmental Impact Assessment Report (rEIAR) sets out the strategic planning context for regularising the planning status of the peat extraction works (and all associated bog development works) that have been carried out within the Application Site, including detailed consideration of the operational and planning history of the Ballivor Bog Group. This chapter considers relevant National, Regional and Local climate action, planning policy and objectives including the Climate Action Plan 2024 (CAP 24). It sets out the scoping and consultation completed, and the cumulative impact assessment process undertaken as part of this rEIAR. This chapter also outlines the historical background of the peat extraction at the site from a strategic perspective, as it was these development policies which not only resulted in the development of the Application Site for peat extraction but facilitated the continuance of peat extraction there through the decades up to and beyond the rEIAR baseline assessment year of 1988.

2.1 Historical Background of Peat Extraction

This section provides a background to the history of the peat industry in Ireland and the development works which have taken place at the Ballivor Bog Group since the 1950s.

Peatlands have long played an important cultural and economic role in Ireland, certainly long before the establishment of Bord na Móna in 1946. Evidence shows that peatlands have been exploited as a fuel resource for well over a thousand years. Indeed, by the 17th century, turf had been established as a major fuel source across Ireland[1]. By the 18th century, as urban centres, particularly Dublin, began to grow, and turf cutting to satisfy growing fuel demands began on a large scale on bogs within economical reach. This was aided by the extension of the Grand Canal, which served as a major transport route for turf to Dublin, through the Bog of Allen as far as Monasterevin, Co. Kildare in 1786. During this time, the policy of the Irish Department of Agriculture and the Board of Trade appeared to prioritise agriculture as Ireland's sole industry, leading to a discouragement of peat fuel development due to concerns about potential competition with British coal. Surveys of peatlands were undertaken by the Bog Commissioners in the early 1800s, which culminated in their publishing a series of four reports between 1810 and 1814, which examined the major bogs of Ireland specifically in relation to their suitability for use in agriculture. The Dublin Society had been actively promoting the drainage of peatlands from 1731 onward to facilitate their reclamation and repurposing as agricultural lands, with the British parliament also supporting this effort, with numerous bills presented between 1823 and 1875 following the publication of the Bog Commissioners reports. However, by the late 19th and early 20th centuries, there was a shift in emphasis towards promoting the development of Irish peatlands for fuel purposes and enhancing the quality of turf as a fuel source.

The peat industry, prior to the establishment by the Government of the Turf Development Board Ltd., which later became Bord na Móna (as discussed below), was largely underpinned by private enterprises and operators. In 1919, the Dáil established a National Commission of Enquiry into the Resources and Industries of Ireland, which in 1921 produced a report on the use of peat for power generation. This report recommended experimenting with the use of peat for electricity and the acquisition by the State of all the large bogs in the country[2]. Interest in peatlands as a fuel resource continued, and in the early 1930s during their election campaign, Fianna Fáil made promises to the public to develop the bogs. In 1933, C.S. 'Todd' Andrews was appointed to the Department of Industry and Commerce to implement a scheme which would focus on the stimulation of private turf production, establish minimum standards for turf produced, fix prices, and organise distribution[3]. With the assistance of the Irish Agricultural

[1] *Feehan, J., O'Donovan, G. (1996). "The Bogs of Ireland: An Introduction to the Natural, Cultural and Industrial Heritage of Irish Peatlands." University College Dublin.*
[2] *Ryan, H., Figgis, D., Connolly, J., Dillon, T., Moore, M., O'Shea, J. P., Sweetman, R., Tweedy, R. N. & Walsh, H. 1921. Report on Peat, Commission of Enquiry into the Resources and Industries of Ireland, pp. 4, 32, 35-38, 78. Dublin.*
[3] *Andrews, C. S. 1982. Man of no Property, The Mercier Press, Cork.*

Organisation Society, some 180 co-operative turf societies were formed to facilitate this scheme. Due to the complexities associated with managing the scheme, C.S. Andrews advocated for the streamlining of the management of national peat resources, and succeeding in persuading Government to establish the Turf Development Board Ltd.

2.1.1 The Turf Development Board Ltd.

The Turf Development Board Ltd ('TDB') was established in 1934 as a state-owned company financed by the exchequer, tasked with the development of peatlands. The identification of suitable peat extraction sites began in 1935, when the TDB began a systemic survey of all Irish bogs. The surveys of the bogs by the TDB built on the knowledge presented in the Bog Commissioners reports, which provided an excellent starting point for the surveys of bogs suitable for peat production. From 1935 to 1937 some 13 initial surveys were carried out and over the next 17 years some 625 separate surveys were done to build an expansive knowledge of peatlands and allow informed decisions to be made with regards the selection of sites for peat extraction.

The Turf (Use and Development) Act 1936 (hereafter 'the 1936 Act') was subsequently passed by the Dáil in June 1936. One of the more significant provisions of the 1936 Act was Section 22(1) which gave the Minister power to acquire land required for the Turf Development Board's operations (e.g. '*production, the preparation for sale, or the storage of turf, or any purpose ancillary to such production, preparation, or storage*') by compulsory purchase. In the same year, the Board acquired Turraun Bog in Offaly and purchased large bogs in Clonsast, Laois, and Lyrecrumpane, Kerry. These bogs were drained and prepared for mechanised use with German "Baggers". Additionally, a peat briquette factory began operations in Lullymore, Co. Kildare in 1936, initially supplying priority industries and the railway network.

2.1.2 The War Years and the Need for Indigenous Fuel

The utilisation of peat as an indigenous fuel resource, as facilitated by the 1936 Act, came into prominence during the Second World War as a consequence of depleted coal reserves within the UK. These depleted coals reserves resulted in a shortage of imported coal into Ireland, on which energy production was largely dependent, which drove the impetus to increase our national fuel independence and security of energy supply using peat. In 1941, Hugo Flinn T.D. was appointed as Turf Controller, with a remit of overseeing the production of native fuels. Flinn established the Turf Emergency Committee, the findings from which informed the establishment by the Government of four major projects aimed at promoting the production and distribution of turf, namely by:

- Encouraging private turf production (the TDB handled publicity and marketing associated with this endeavour);
- Establishing County Council production schemes, in which County Councils took responsibility for the production of turf, with the assistance of powers bestowed on them by the Government to compulsorily acquire, work and let turf banks;
- Acquiring bogs and other lands in a scheme which became known as the 'Kildare Scheme'. The Kildare Scheme involved the crash development of c. 24,000 acres of bog, as well as the building of fourteen residential camps to house workers developing peat resources; and,
- Producing machine turf, briquettes and hand-won turf on TDB bogs.

The implementation of these Government projects during the Second World War ensured that Ireland had continuity of energy supply, at a time when the fuel imports on which the country so heavily relied, dwindled.

2.1.3 Establishment of Bord na Móna and the First Development Programme

Following the Second World War, there the Irish State was keen to continue to develop indigenous fuel resources to increase national energy security, particularly in the event that imported fuels were ever scarce again. The TDB were asked of the Government to devise a programme to develop the country's bogs. The initial result of this was the transformation of the TDB into Bord na Móna, which was established as a statutory authority responsible for the '*development of the nation's peat resources*' under the Turf Development Act 1946 ('the 1946 Act'). The functions of Bord na Móna, as per Section 17(1) of the Act, are as follows:

(a) To produce and market turf and turf products;
(b) To foster the production and use of turf and turf products;
(c) To acquire bogs and other lands;
(d) To manage, develop and work bogs and other lands vested in the Board [Bord na Móna]*; and*
(e) Generally to do all such other things as arise out of, or are consequential upon, the duties mentioned in the preceding paragraphs of this section.

At this time, the Government issued a White Paper which set out a comprehensive plan for the development of the country's peat resources by mechanical mechanic methods, and which would also consequently reduce the country's reliance on imported fuel, while also providing substantial employment. This White Paper later became known as the First Development Programme. The principal proposals of the First Development Programme were as follows:

- The development of 24 no. bogs for peat extraction;
- The improvement of Lullymore Briquette Factory;
- The erection of a peat moss litter factory at Kilberry;
- The establishment of a Government-funded peat research station; and,
- The building of Portarlington, Allenwood, and Lanesborough peat-fired power stations.

The First Development Programme also outlined policies which underpinned the Government's commitment to developing the national peat resource for energy production, namely that new projects for the production of electricity were to be based on the use of turf, that all public or state-assisted housing in turf-producing areas were to have appliances suitable for burning turf, that all institutions built by local authorities were to have boilers capable of burning turf, and that any factories in turf-producing areas receiving government grants would be obliged to install turf-burning equipment.

By 1946, Bord na Móna employed 5,138 workers, and several bogs were either in development or already in production.

2.1.3.1 The Second Development Programme

In 1947, Bord na Móna proposed to the Government the doubling of the output of the ongoing First Development Programme. The proposal was well-received and resulted in the enactment of the Turf Development Act 1950 ('the 1950 Act'), effective from July 26th, 1950, which empowered Bord na Móna to broaden its scope of operations. This legislation marked the beginning of the Second Development Programme. Plans were made for expanding activities to achieve a capacity of two million tonnes of machine sod turf annually as well as the construction of five additional power stations at Ferbane, Rhode, and Shannonbridge Co. Offaly, Bellacorick, Co. Mayo, and Unit 2 of Lanesborough Power Station, Co. Longford. Furthermore, under Section 5(1) of the 1950 Act, Bord na Móna was granted the authority to build housing for its permanent workforce. Nine housing schemes, totalling 582 houses, were proposed to the Minister of Industry and Commerce for approval, with site development work commencing in 1951.

In the early 1950s, discussions between Bord na Móna and the Electricity Supply Board ('ESB') focused on expanding turf usage for electricity generation. They also considered the potential of milled peat as a boiler fuel for power stations. By 1952, Bord na Móna began supplying turf to the ESB's Allenwood station and identified suitable bogs for further development. In subsequent years, milled peat production started in the Boora bogs to fuel the planned Ferbane and Lanesborough stations. Additionally, briquette factories were constructed, and horticultural endeavours expanded.

The Second Development Programme resulted in a significant increase in peat production output with 15 no. bogs (including Ballivor bog) coming into production between 1955 and 1959. Notably, Bord na Móna prepared for the construction of a milled peat power station in Bellacorrick, Co. Mayo, and development continued for the Shannonbridge station. Significant investments were also made in infrastructure, such as railways and roads within bog areas, as well as machinery development, to improve the efficiency and safety of peat extraction and transportation. By the late 1960s, Bord na Móna's operations had significantly increased, supplying seven ESB power stations. The company was also running three briquette factories and two horticultural peat factories, and the area of bogs allocated for energy, fuel, and horticultural peat production had notably expanded.

2.1.3.2 The Third Development Programme

The growing need for resources to supply the country's peat-fired power stations, and the later oil crisis emerging in the 1970s, highlighted the importance of indigenous fuel resources, and furthermore, Bord na Móna's role in supporting the provision of a robust power system. Peat emerged as a cost-effective alternative to other fuels during this period of hardship, prompting the government to request investments from Bord na Móna. In response, the Turf Development Act of August 1975 increased the company's capital borrowings to £60 million, facilitating the implementation of the Third Development Programme. This programme involved purchasing approximately 30,000 additional hectares of land and investing £164 million, including plans for expanding peat generating capacity and constructing new briquette factories.

By 1980, significant progress had been made in drainage and development works on about 17,000 hectares of the acquired land. The majority of these works related to the extension of its existing operations and the expansion of horticultural peat production. For example, growing demand for packaged sod peat in polythene bags led to a bagging plant being constructed and commissioned at the Ballivor Works between 1969-70. Bord na Móna became a vital contributor to Ireland's social and economic landscape, employing approximately 7,000 workers at its peak. Major civil works were carried out to extend the railway network and associated infrastructure, supporting the expansion of operations and horticultural peat production.

However, despite the increased utilisation of peat, the Third Development Programme faced financial challenges as it relied on high oil prices, which did not materialise. Additionally, the emergence of natural gas from Kinsale in 1979 and the Private Turf Development Act of 1981 led to shifts in consumer preferences towards more efficient fuels and encouraged private development of smaller bogs. Consequently, Bord na Móna's market share decreased, leading to the decision to construct only one new briquette factory in Littleton, Co. Tipperary.

2.1.3.3 After the Third Development Programme

By the late 1980s, Bord na Móna faced challenges as high-cost producers in an already costly industry. Falling energy prices exacerbated the situation, along with adverse weather conditions, particularly in 1985 and 1986. Despite these difficulties, the company's milled peat harvest in 1985 fell short of the target by 39%, leading to the difficult decision to lay off 2,300 employees by the end of August 1986. However, favourable weather in late autumn allowed for an unexpected extension of the harvesting season, resulting in 45% of the annual target being achieved during that time. Ultimately, the year's total harvest reached 78% of the target, largely due to the determination of the employees. This success

prompted the company to proceed with only 350 layoffs, mostly on a voluntary basis, based on improved financial forecasts.

From 1989 to 1993, Bord na Móna implemented a rationalisation program aimed at reducing high production costs and boosting productivity. Various cost-cutting initiatives were introduced across all company operations. In the financial year 1988/89, staff costs amounted to £59.1m out of a total operating cost of £100m. Significant workforce reductions were made, and a new system called Autonomous Units was implemented, where workers were paid based on output and efficiency, resulting in productivity gains. However, around 3,500 jobs were lost during this process. Additionally, the company underwent divisionalisation in April 1989, with separate divisions established to operate autonomously, aligning the company's focus more closely with market demands and customer needs.

2.1.4 Development at Ballivor Bog Group

This section of the rEIAR sets out the operational history of Bord na Móna at the Ballivor Bog Group specifically.

1950s Development

As discussed in Section 2.1.3.1, the increasing consumption of electricity in the post-war period led Bord na Móna in 1950 to embark on a Second Development Programme. This provided for further increases in sod turf production and also introduced major targets for a more mechanised form of peat production - milled peat[4]. The production of 174,000 tonnes of sod peat and 2,290,000 tonnes of milled peat per annum was envisaged under this programme. It was expected to achieve these outputs by 1960.

The Annual Report for the year ended 31st March 1951 states; "*preliminary development work was commenced on the Second Development Programme. Some areas were laid out and the drainage of many outfalls and internal drainage was begun*" (p18). It is noted that it can take three to five years (dependent on area) from the initiation of development of a bog to the commencement of production (Unidentifiable document from Newbridge library). Annual Report year ended 31st March 1951 shows that Bracklin bog, Co. Westmeath was listed for development under the programme (also known as the Second Post War Plan). The preliminary development balance sheet for 1950-51 shows expenditure at Bracklin bog on drainage, buildings, railways, engineering supplies, overhead expenses and lands (p92a) indicating that development work on the bog was underway.

Annual Report year ended 31st March 1952 shows that drainage and development work proceeded at Bracklin bog; The work of survey, preliminary development and drainage on the bogs of the Second Development Programme was continued during the year" (p12). Expenditure on bog development work at Bracklin (drainage, buildings, railways, engineering supplies, overhead expenses, lands) is also shown during the same financial year (p96a).

In the 1952-53 Annual Report, it is noted that Ballivor Bog, Co. Meath was now listed as under preliminary development (First Post War Plan) (p109). Expenditure at Ballivor was indicated on drainage, buildings, machines, railways, power lines, engineering supplies, overhead expenses, lands and stores (Annual Report year ended 2nd April 1953, p109a). The same report also states; *"The work of drainage and preparation for machine turf production of the bogs in the First Development Programme reached the final stages. Turf cutting machines were operated at Ballivor to assist with final drainage prior to the commencement of production operations"* (p12).

The construction of main railway lines between Ballivor Works and Bracklin Works also commenced in 1952-53 (p11). The balance sheet for the year ended 2nd April 1953 continued to show development

[4] *Bord na Mona Administration Spring 1959, p5*

expenditure (drainage, buildings, railways, engineering supplies, overhead expenses, lands) at Bracklin bog (p111a).

The Annual Report year ended 1st April 1954 shows that machine turf was produced at Ballivor Works (p11). Trading and profit and loss accounts detailing production, miscellaneous and working expenses are now presented for Ballivor Works (p105). In preparation for machine turf production, drainage operations were continued at Bracklin bog during 1953-54 (p13). Work also continued on the main rail line between Ballivor and Bracklin (p14). For the year ended 1st April 1954 the preliminary development balance sheet shows expenditure at Bracklin bog on drainage, buildings, railways, engineering supplies, overhead expenses, lands (p129a).

By the year ended 31st March 1955, production was in progress at fifteen Bord na Móna sod peat bogs (including Ballivor) from the First Development Programme (Annual Report year ended 31st March 1955). It was anticipated that the First Development Programme would be completed as planned in 1956 (Unidentifiable document from Newbridge library). Annual Report year ended 31st March 1955 states that*; "Drainage in preparation for machine turf production was carried out at Bracklin bog. Small turf cutting machines were used to assist final drainage at Bracklin and to prepare the cutting trenches for the larger machines which will operate on them when production commences"* (p13). The same report also mentions that; *"Work continued on the main line between Ballivor and Bracklin and that workshops at Ballivor were extended to serve the additional requirements of Bracklin bog"* (p13).

By 1955-56, drainage work in preparation for sod peat production continued at Bracklin; *"Small fully automatic turf cutting machines were operated to assist final drainage work. Bog development work at Bracklin was well advanced at this stage and it was proposed to operate large cutting machines there in 1956"* (Annual report year ended 31st March 1956, p13).

The railway link between Bracklin and Ballivor bogs was completed in 1956-57 (Annual report year ended 31st March 1957, p14).

Annual report year ended 31st March 1958 states; *"Work proceeded on the sod peat development bogs and drainage is approaching the final stages. At Bracklin bog, machine turf was produced as an aid to drainage. The turf cut in this way was harvested and made available for sale"* (p13).

Annual Report year ended 31st March 1959 states; *"Drainage operations proceeded on the sod peat development bogs including at extensions to Ballivor. Some machine turf was produced as part of this drainage work"* (p15).

1960s Onwards

The Annual Report for the year ending 31st March 1960 indicates that development work at Lisclogher bog was well advanced by 1959-60. The report states that; "*Drainage operations proceeded at Lisclogher for sod peat production, with the bog set to be in production in 1960*" (p16).

Machine turf continued to be produced from the Ballivor bog group throughout the 1960s and 70s. The demand for packaged sod peat in polythene bags led to a plant being installed at Ballivor Works in 1969-70 (Annual Report year ended 31st March 1970, p13).

During the 1980s it was agreed to install a peat moss supply plant at Ballivor Works which would dispatch peat in a bulk system by compressing the peat into shipping containers for delivery to the horticulture industry overseas. The 1983-84 Annual Report indicates that site preparation work for the processing and loading plant at Ballivor had commenced (Annual Report year ended 31st March 1984, p10). The facility opened in 1985.[5]

[5] *Brown Gold: A history of Bord Na Mona and the Irish peat industry*

In addition to sod peat production, 1984-85 saw milled peat produced from Ballivor for the first time with an output of 31,686 tonnes recorded for the period (Annual Report year ended 31st March 1985, p5).

The following year, the factory at Ballivor had a moss peat output of 103,697 cubic metres (Annual Report year ended 31st March 1986, p2).

Annual Report year ended 31st March 1987 details the output from Ballivor for 1986-87 (p4);

- Machine turf - 35,501 tonnes
- Milled peat - 22,857 tonnes
- Moss peat - 203,052 cubic metres

2.2 Ballivor Bog Group – Operational History

The development of the Application Site commenced in 1948 during the First Development Programme. Table 2-1 below summarises the various bogs and operations at each.

Table 2-1. Ballivor Bog production timelines taken from Annual Reports (1951 – 1970, 1984 to 1987) as set out in Chapter 4 of this rEIAR

Bog		Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Began	Extraction Ceased
Ballivor		1948	1953	June 2020
Carranstown	**Western portion of Carranstown**	1974-1987	By 1988* (Western side)	June 2020
	Eastern portion of Carranstown	1974-1987* drainage inserted only 1989-1995* Clearance works	By 1995	June 2020
Bracklin	**Main Bracklin Bog area**	1950	1957	By 2003
	Western portion of Bracklin	1979-1988, drainage inserted throughout Bracklin West By 1988 vegetation clearance in southern portion only	Between 1985 and 1995* at northern portion of Bracklin West By 1988* at southern portion of Bracklin West	June 2020
Lisclogher		1950	1960	March 2003 for milled peat. Sod peat (third party) was extracted

			in the northeast until 2020.
Lisclogher-West	Minor works commenced in 1973 Main Drainage installed between 1973 and 1988 Drainage was complete post 1988*	N/A	N/A

*indicated by aerial photography

Volumes of extracted peat from 1954-1962 have been estimated as described in Chapter 4 of this rEIAR while the overall volumes of peat extraction from the Ballivor Group between 1954-1987 is recorded by Bord na Móna to be approximately 1,592,675 tonnes (sod and milled). The extent of the overall Bog Group and its component bogs which makes up the Application Site are located in Counties Meath and Westmeath and is shown in Figure 2-1.

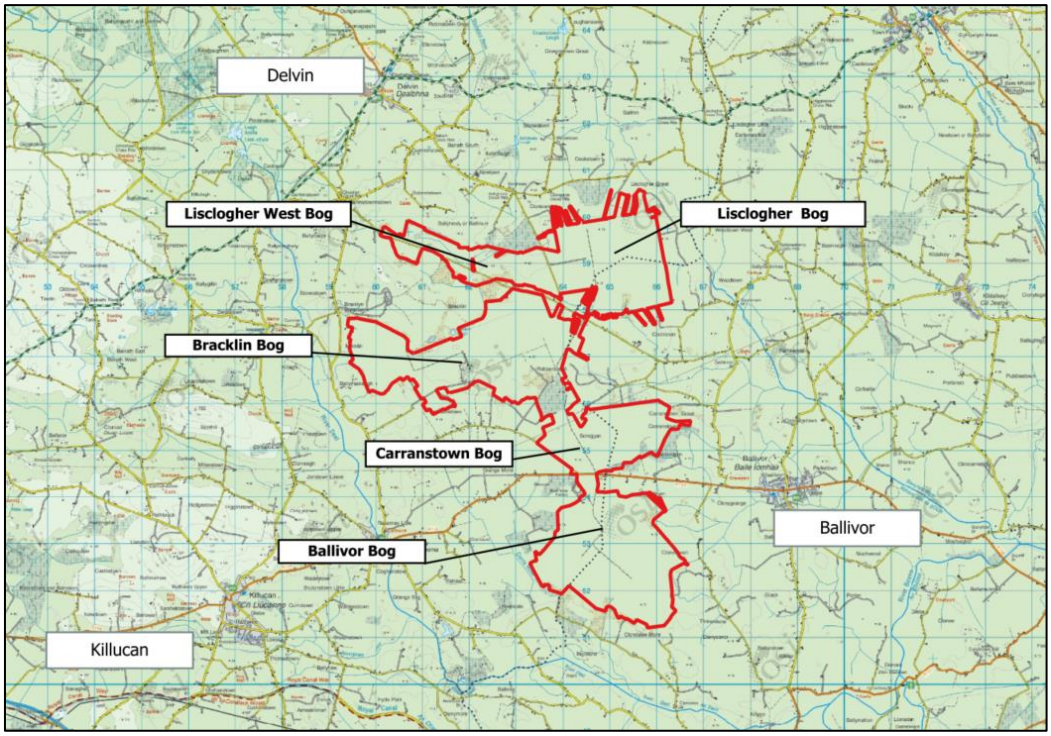


Figure 2-1: Ballivor Bog Group – Extract of Site Location Context Map

Industrial scale peat extraction was ceased within Ballivor, Bracklin West and Carranstown Bogs in September 2019 following the High Court's judgment on *Friends of the Irish Environment Ltd v Minister for Communications, Environment & Climate Action & Ors. [2019] IEHC 646*, as discussed in greater detail below in Section 2.1.3, which set aside the Peat Regulations[6] in their entirety. Subsequent to lodging a substitute consent application (SU25M.307278), peat extraction temporarily re-commenced between the 11th June 2020 and 30th June 2020 (c. 2/3 weeks) within Ballivor, Bracklin West and Carranstown Bogs. Peat extraction ceased (30th June 2020) when it was confirmed that peat extraction could not re-commence prior to An Bord Pleanála's decision on SU25M.307278 (which was ultimately withdrawn on the 14th January 2021). Bord na Móna formally announced in January 2021 that all industrial scale peat extraction on lands within its management would permanently cease in line with its

[6] *S.I. No. 4/2019 – European Union (Environmental Impact Assessment) (Peat Extraction Regulations 2019)*

on-going climate action programme and its transition to becoming a climate solutions company, as discussed further below in Section 2.2.6.

From mid-2020 to mid-2021 the operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

In summary, development works began at the Application Site in the late 1940s. Industrial scale peat extraction subsequently commenced from 1953 to June 2020 for the production of sod moss, sod, and milled peat for horticultural and fuel purposes.

2.2.1 Site Planning History

There have been a range of planning applications lodged for development within the overall footprint and adjacent to Ballivor Bog Group. These are set out in Tables 2-2 and 2-3 below. Table 2-2 lists the applications within the Application Site boundary while Table 2-3 lists those that are associated with peat extraction activities but are outside of the Application Site boundary. The first application was submitted in 1972 (Pl Ref. 72/356) outside of the Application Site and the most recent application lodged in 2023 (ABP Ref. 316212) within the Application Site.

Table 2-2: Planning Applications within the Application Site Boundary

Bog Ref.	Planning Ref.	Description	Planning Authority Decision
Lisclogher West	WMCC Ref. 12/2067	Laying two intersecting grass strips, 150m x 7m and 75m x 7m, for use as a take-off and landing area for model aircraft and a grass area, 10m x 30m for car parking	Final Grant (18.06.2013)
Lisclogher	WMCC Ref. 15/6135	To erect a guyed wind monitoring mast, with instruments, up to 100m in height	Final Grant (13.10.2015)
Lisclogher	WMCC Ref.	Erect a guyed wind monitoring mast with instruments up to 100m in height.	Final Grant (25.01.2017)
Lisclogher	WMCC Ref. 21/620	Retention of guyed wind monitoring mast	Final Grant (23.02.2022)
Bracklyn	ABP: 311565	Wind Farm Development including 9 turbines and all associated works	ABP Final Grant – 07/07/2022
Ballivor Bog Group	ABP: 316212	Proposed development of 26 wind turbines and associated works	No decision

It should be noted that the above developments listed in Table 2-2 do not have any connection with the licenced peat extraction activities undertaken within the bog group.

There have been several planning applications lodged to Westmeath County Council associated with the Ballivor Works (Table 2-3 below) and associated services / infrastructure ancillary to peat extraction activities which are adjacent to, but outside of the Application Site. These developments have been considered within the cumulative assessment carried out as part of the rEIAR and rNIS.

Table 2-3 Planning Applications outside the Application Site Boundary

Planning Ref.	Description	Planning Authority Decision
WMCC Ref. 72/356	Erection of covered loading bay at Ballivor works	Final Grant (18.07.1972)
WMCC Ref. 77/441	Extension to workshop at Ballivor	Final Grant (05.08.1977)
WMCC Ref. 83/382	Bulk loading facility at Grangemore Works, Raharney	Final Grant (15.08.1983)

Planning Ref.	Description	Planning Authority Decision
WMCC Ref. 87/41	Erect Workshop at Grangemore, Raharney	Final Grant (18.09.1987)
WMCC Ref. 88/14	Erect tea centre at Grangemore, Raharney	Final Grant (03.03.1988)
WMCC Ref. 90/554	Extension to storage facilities	Final Grant (13.12.1990)
WMCC Ref. 05/2348	Construct a 10/20 kV ESB substation to service Ballivor Horticulture Factory	Final Grant (30.01.2006)

2.2.2 Planning History of Peat Extraction at the Ballivor Bog Group

Industrial-scale peat extraction was on-going within the Application Site prior to 1988, before the required transposition of the EIA Directive and Habitats Directive, with peat extraction commencing as early as 1953 for individual bogs within the Application Site. These works benefited from a planning exemption up until the 20th September 2012 when the Environment (Miscellaneous Provisions) Act 2011 was enacted, and Section 4(4) was inserted within the Act. The implications of Section 4(4) on the peat extraction industry remained ambiguous between 2012 and 2019 as planning cases relating to peat extraction and EIA/AA were considered and tested within both the planning system (ABP Ref. PL25.RL.2975) and legal system (*Westland Horticulture Limited and Bulrush Horticulture Limited v An Bord Pleanála* ((2013/398/JR – [2018] IEHC 58)).

The 'Peat Regulations', (S.I. No. 4/2019 – European Union (Environmental Impact Assessment) (Peat Extraction) Regulations 2019) which attempted to provide further clarity on this issue (e.g. exemption from planning permission for large scale peat extraction activity (30ha or over)) were ultimately quashed by the High Court in September 2019 (*Friends of the Irish Environment Limited v Minister for Communications, Climate Action and Environment, Minister for Housing, Planning and Local Government Ireland and The Attorney General* [2019] IEHC 646) on the grounds that the legislation was inconsistent with the requirements of the EIA Directive and the Habitats Directive.

In the interim, the Applicant had continued with the established industrial scale peat extraction in line with the conditions of its IPC Licence (Ref. P0501-01). On foot of [2019] IEHC 646, the Applicant ceased peat extraction on peatlands within its management, including the Application Site, and dutifully proceeded to prepare and lodge an application seeking leave to apply for substitute consent in December 2019 for the relevant works within a portion of the Derrygreenagh Bog Group (including Ballivor, Bracklin and Carranstown Bogs) with the intention of continuing said works into the future.

The Applicant was granted leave to apply for substitute consent and subsequently lodged an application for substitute consent for the relevant peat extraction works to the Board (SU25M.307278) on the 2nd June 2020. Subsequent to lodging the substitute consent application, peat extraction temporarily re-commenced at the application site in Bracklin, Ballivor and Carranstown Bogs between the 11th June 2020 and 30th June 2020 (c. 2-3 weeks). Peat extraction ceased June 30th 2020 when it was confirmed that peat extraction could not re-commence prior to the Board's decision on ABP Ref. SU25M.307278.

The Applicant formally announced in January 2021 that all industrial scale peat extraction on lands within its management would permanently cease. As such, ABP Ref. SU25M.307278 was withdrawn by the Applicant on the 14th January 2021 due to changes in the operational requirements of the bog group concerned.

The Applicant submitted a second leave to apply for substitute consent application in October 2021 (ABP Ref. LS17.311646) to regularise peat extraction and related activities carried out at Ballivor Bog Group and to facilitate appropriate future uses. Following the enactment of the Amendment Act in August 2022 (detailed in Section 2.2.5), the substitute consent process changed from a two-step to a one-step application process i.e. the leave stage was removed. The pending leave application was subsequently deemed withdrawn by the Applicant by An Bord Pleanála in January 2024 in accordance

with Planning and Development, Maritime and Valuation (Amendment) Act 2022 (Commencement of Certain Provisions) (No.2) Order 2023.

As a result, substitute consent is now being sought by the Applicant of their own volition to regularise, without prejudice, the planning status of the Application Site to facilitate appropriate future uses of these lands in compliance with the requirements of the planning system. Substitute consent is being sought for the relevant peat extraction activities that were undertaken at the Application Site from 3rd July 1988 onwards, as described in Section 1.4 of Chapter 1 Introduction. Further detail on the Project description is included in Chapter 4 Description of the Development.

Bord Na Móna have been involved with other applications for leave to apply and applications for substitute consent in the past. Derrygreenagh Bog group is an example of this, further details are outlined below.

Leave to Apply for Substitute Consent for Peat Extraction at Derrygreenagh Bog Group– December 2019

Bord na Móna previously applied to An Bord Pleanála ('the Board') for leave to apply for substitute consent for peat extraction works and all associated activities within the Derrygreenagh Bog Group (Bracklin, Carranstown, Ballivor, Kinnegad and Ballybeg) in Counties Meath, Offaly and Westmeath in order to regularise the planning status of peat extraction carried out since 20th September 2012 with the intended purpose to continue these activities into the future. An application seeking leave to apply for substitute consent (LS25M.306236) was lodged to the Board on the 16th December 2019 and the Board subsequently granted permission to apply for substitute consent for these historic activities on the 1st May 2020. In allowing Bord na Móna to apply for substitute consent, the Board was satisfied that, in light of the size and scale of the peat extraction carried out subsequent to 20th September 2012 within the Derrygreenagh Bog Group and the proximity of the peatland sites to a number of European sites, an EIA and an AA were required in respect of the development concerned, and that exceptional circumstances existed to warrant an opportunity to regularise the development.

Substitute Consent Application for Peat Extraction at Derrygreenagh Bog Group– June 2020

The Applicant lodged an application for substitute consent for the relevant peat extraction works at Derrygreenagh Bog Group to the Board (SU25M.307278) on the 2nd June 2020. Subsequent to lodging the substitute consent application, the Applicant formally announced in January 2021 that all industrial scale peat extraction on lands within its management would permanently cease. As such, SU25M.307278 was withdrawn by the Applicant on 14th January 2021 due to changes in the operational requirements of the bog group.

It has been established by the Court of Justice of the European Union in Case C-215/06 (Commission v. Ireland), that "substitute consent" is only permitted in exceptional cases. The judgment of the Supreme Court in *An Taisce v. An Bord Pleanála [2020] I.E.S.C. 39* found that Sections 177C(2)(a) and 177D(1)(a) of the Planning & Development Act 2000 (as amended) ("the Act") were inconsistent with the EIA Directive, as interpreted by the Court of Justice, in that they failed to provide adequately for the exceptionality test as demanded by that Court. The Act has been amended to make adequate provision for the exceptionality test[7]. Accordingly, Section 177K(1A) of the Act requires that, in any given case the Board must be satisfied that exceptional circumstances exist that would justify the grant of substitute consent.

The purpose of this current substitute consent application is to regularise, without prejudice, the planning status of the peat extraction works and all associated activities completed within the Application Site.

[7] *Planning and Development, and Residential Tenancies Act 2020 introduced a number of alterations to Section XA of the The Act (as amended) in relation to the substitute consent process, and in particular, the consideration of exceptional circumstances as part of the overall decision-making process*

2.2.3 Integrated Pollution Control Licence (IPC) Licence (Ref. P0501-01)

Bord na Móna is currently the only operator in Ireland licenced by the Environmental Protection Agency (EPA), as per Part IV of the Environmental Protection Agency Act 1992, to carry out the extraction of peat in an area exceeding 50 hectares. Bord na Móna was granted its Integrated Pollution Control Licence (IPC) Licence (Ref. P0501-01) from the EPA for the Derrygreenagh Bog Group, of which Ballivor Bog Group is a subset, on 26th April 2000. The EPA issues licences that contain strict conditions on how an activity must operate so as to protect the environment from pollution that might otherwise arise. The EPA Act, 1992 specifically prohibits the EPA from granting a licence if emissions from the activity would cause pollution[8].

The EPA has undertaken Technical Amendments of the licence on 27th September 2012, 18th June 2013 and 25th February 2014 for the purpose of aligning the operational conditions of the licence to the objectives of National and European environmental protection legislation enacted over the lifetime of the licence. The current IPC Licence contains 14 no. conditions relating to operation and monitoring, emissions to water and air, water protection, waste management and bog rehabilitation. The IPC Licence is managed by the Bord na Móna's Environmental Management Department in Land and Habitats, with three Compliance Officers located in these operational areas who manage the day-to-day compliance requirements.

As per Condition 2 (Management of the Activity) of the IPC Licence, Bord na Móna is required to maintain an Environmental Management System (EMS) which fulfils the requirements of the licence and any associated objectives / targets relating to use of cleaner technology, cleaner production and the reduction and minimisation of waste. The EMS is required to form part of the Annual Environmental Report (AER), which details Bord na Móna's annual record of compliance with the terms of its licence, which is generally submitted to the EPA prior to 31st of March of each year. A copy of the AERs (2008 – 2021) submitted in compliance with the conditions set out within IPC Licence P0501-01 are available to view on the EPA's web portal[9]. All AERs can be found in Appendix 4-3. The EPA's online web facility provides further opportunities for the public to observe records relating to the Applicants the on-going licenced operations and associated assessments (the public can also make observations/complaints directly to the EPA in relation to any licenced activities) The most recent AER submitted by Bord na Móna was the AER for 2023 and covers the 2023 calendar year.

The EPA regularly audit and inspect compliance with its IPC Licences. Audits and inspections of the Derrygreenagh Bog Group for 2021 were conducted in November 2019 and these reports are available on the EPA's web portal[10]. The EPA conducted a site visit at Derrygreenagh Bog Group (specifically Carranstown Bog) in March 2022 during which the EPA inspected sections of the licenced area and documentation. The EPA did not report any areas of non-compliance by Bord na Móna. There were no complaints raised on Bord na Móna's licenced activity during the 2023 calendar year nor have there been any open compliance investigations with the EPA since the 4th of June 2022 regarding the Derrygreenagh Licence. These site visits were conducted as part of the EPA's annual site visit programme to check compliance with licence conditions.

[8] *https://www.epa.ie/our-services/licensing/industrial/integrated-pollution-control-ipc-licensing/*
[9] *https://epawebapp.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0501-01&classification=Enforcement*
[10] *https://epawebapp.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0501-01&classification=Enforcement*

2.2.4 Peat Extraction - Environmental Impact Assessment and Appropriate Assessment Context

Peat extraction activities, which were within the definition of 'agriculture' with regard to turbary, were classified as exempted development under Section 4(1)(a) of the Local Government (Planning and Development) Act 1963, and this exemption was generally continued under Section 4(1)(a) of the Planning and Development Act, 2000 ('the Act'), which stated the following:

> *"4.-(1) The following shall be exempted developments for the purposes of this Act –*
>
> *(f) Development consisting of the use of any land for the purpose of agriculture and development consisting of the use for that purpose of any building occupied together with land so used;"*

It should be noted however, that the 1963 Act included the use of the land for turbary within the definition of Agriculture, while the Act, 2000 did not. The Planning and Development Regulations 2001 (as amended) ("the Regulations") include exemptions for certain classes of peat extraction Class 17, Part 3 (Schedule 2) refers:

Class 17 (Part 3, Schedule 2)

a. Peat extraction in a new or extended area of less than 10 hectares, or
b. Peat extraction in a new or extended area of 10 hectares or more, where the drainage of the bogland commenced prior to the coming into force of these Regulations.

The provisions of Class 17 (Subpoint b) remained relevant to the peat extraction works and all associated activities undertaken at the Application Site due to the historic nature of the drainage activities on site. The enactment of the Environment (Miscellaneous Provisions) Act 2011 on the 20th of September 2012, inserted Section 4(4) into the Act[11],

> *"Notwithstanding paragraphs (a), (i), (ia) and (l) of subsection (1) and any regulations under subsection (2), development shall not be exempted development if an environmental impact assessment or an appropriate assessment of the development is required."*

Prior to the enactment of the Environment (Miscellaneous Provisions) Act 2011, Westmeath County Council referred a Section 5 Declaration of Exemption (S5-24-11) to the Board on the 2nd of February 2012 concerning whether the drainage of boglands, peat extraction, accesses from public roads and peat handling activities at another site at Lower Coole, Mayne, County Westmeath was or was not development and whether it constituted exempted development (An Bord Pleanála Ref. RL2975).

The Board concluded that the on-going development (i.e. the continuation of works to extract peat) on the subject site remained exempted development as per the adoption of The Act, despite the omission of the reference to turbary in Section 2 of the Act, by virtue of Article 11[12] of the Planning and Development Regulations 2001 and regardless of whether an EIA or AA is required. However, the Board then went on to consider whether the ongoing extraction of peat (that was not completed by the

[11] *Section 4(4) did not apply to development "completed not later than 12 months after such commencement*
[12] *Article 11 of the Planning and Development Regulations 2001 (as amended): "Development commenced prior to the coming into operation of this Part and which was exempted development for the purposes of the Act of 1963 or the 1994 Regulations, shall notwithstanding the repeal of that Act and the revocation of those Regulations, continue to be exempted development for the purposes of the Act."*

21st September 2012[13]) and which formed part of the Section 5 referral[14] to the Board would need EIA and/or AA in the context of Section 4(4) of the Act (which had been inserted during the consideration RL.2975). The Board ultimately concluded that,

> *"because the development involved in continued works to extract peat from the site requires an Environmental Impact Assessment and Appropriate Assessment then, notwithstanding Article 11 of the Planning and Development Regulations 2001, any such works on or after the 20th day of September 2012 is not exempted development by virtue of section 4(4) of the Planning and Development Act, 2000, as inserted by section 17 of the Environment (Miscellaneous Provisions) Act 2011"*

The Board's decision on RL.2975 broadly established the precedent that the drainage of boglands and extraction of peat was development and not exempted development with regard to Section 4(4) of the Act. Westland Horticulture Limited and Bulrush Horticulture Limited were granted leave to seek judicial review to apply for an order of *certiorari* for quashing the Board's decision on RL.2975 on the basis, inter alia, that the extraction of peat was a 'use', rather than works, and therefore, the development / works required to facilitate this use would have been completed '*not later than 12 months after such commencement'* and peat extraction (as a use) should continue to be exempted development (*Westland Horticulture Limited and Bulrush Horticulture Limited v An Bord Pleanála (2013/398/JR – [2018] IEHC 58)*. This argument was ultimately rejected by Mr. Justice Meenan in his judgment (February 2018) in which he held that peat extraction was both works and use and, as peat extraction involving a new or extended area of 30 hectares or more required EIA (Schedule 5, Part 2, Class 2a of the Regulations), planning permission was required. This decision was subject to an application for leave to appeal, which was refused on 7th December 2018, and consequently, the Board's decision on RL.2975 was upheld by the High Court. As established by RL.2975 and the subsequent High Court judgment on [2018] IEHC 58, the need for EIA and/or AA effectively de-exempts peat extraction over 30 hectares due to the provisions of Section 4(4), and therefore, planning permission is required.

Following the High Court judgment under [2018] IEHC 58, the 'Peat Regulations' were enacted in January 2019, which consisted of two pieces of legislation[15] that provided for an exemption from planning permission for large scale peat extraction activity (30ha or over) and the introduction of a regulatory framework (to include both EIA and AA) for these developments to be operated by the EPA within its activity licensing regime. The 'Peat Regulations' were subsequently challenged[16], and ultimately quashed, by Mr Justice Simons by way of his judgment on 20th September 2019, and the following Order (18th October 2019) on the basis that they were invalid on the grounds that the legislation was inconsistent with the requirements of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (amended by Directive 2014/52/EU of 16 April 2014) (the EIA Directive) and Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and the use of secondary legislation to give effect to the new licensing regime under the EPA was *ultra vires*. With regard to Class 17 and the introduction of Section 4(4) as discussed above, it is important to highlight the observation of Justice Simons within his consideration of [2019] IEHC 646,

> *"One of the curious features of the approach initially taken to peat extraction under domestic legislation is that a distinction had been drawn between existing peat extraction, and peat extraction involving "new or extended" areas. Although not stated in express terms, the*

[13] *This being the date Section 17 of the Environment (Miscellaneous Provisions) Act 2011 came into force – S.I. No 474/2011 changing Section 4 of the Act.*
[14] *In accordance with Section 5 of the Planning and Development Act 2000 as amended any person may request a declaration as to whether development is exempt. An application should be made in writing to the planning authority, to determine whether a proposal requires permission or is considered exempted development.*
[15] *European Union (Environmental Impact Assessment) (Peat Extraction) Regulations 2019, and The Act (Exempted Development) Regulations 2019*
[16] *Friends of the Irish Environment Ltd v Minister for Communications, Environment & Climate Action & Ors. [2019] IEHC 646*

assumption underlying the legislation seems to have been that existing peat extraction did not have to comply with the EIA Directive. In order to benefit from this special treatment under domestic law, all that was necessary was that the drainage of the bogland had commenced prior to the coming into force of the relevant parts of the Planning and Development Regulations 2001 on 21 January 2002. Thus, it was not necessary even that the peat extraction had commenced prior to the implementation date for the EIA Directive on 27 June 1988."

The observation of Mr Justice Simons on the interpretation of previous planning law for peat extraction activities is insightful in reflecting the ambiguity of the regulating framework for this type of activity pre-2012 / 2013.

2.2.5 Recent Updates to Substitute Consent Legislation

This application for substitute consent is made pursuant to recent updates made to legislation on governing Substitute Consent. The Planning and Development, Maritime and Valuation (Amendment) Act 2022 (Commencement of Certain Provisions) (No.2) Order 2023 (S.I. 645 of 2023) was signed on the 15th December 2023 by Mr. Darragh O'Brien, T.D., Minister for Housing, Local Government and Heritage and came into effect on 16th December 2023.

The Commencement Order and The Planning and Development (Amendment) (No.4) Regulations 2023 comprise measures that amend the Act, and related articles in the Planning and Development Regulations 2001 (as amended) to provide for a streamlined substitute consent process. The amendments follow on from the interim provisions provided for in the Planning and Development and Residential Tendencies Act 2020.

The commencement order commences the relevant provisions in the Planning and Development, Maritime and Valuation (Amendment) Act 2022, which amends the 2000 Act. The measures introduced include provisions which allow for pre-application consultations with the Board and for a single stage application process which removes the requirement to apply for leave to apply from the Board.

These changes were brought in prior to the most recent changes aimed at streamlining the process. The changes mentioned in this section altered the leave process which has since been removed

2.2.6 Ballivor Bog Group – Future Uses

Bord na Móna's operations and management of its lands have historically reflected the overarching needs and aims of the country whether being the development of a national indigenous fuel source, or now, the need to reach net zero emissions and establish a low carbon power system by 2050. In this regard, Bord na Móna has historically exhibited a forward-facing approach to how Ireland's peatlands should be utilised for the betterment of local communities and citizens. Bord na Móna's current vision of a climate neutral Ireland and its transformation into a 'climate solution' company is therefore not a matter of happenstance; but rather, a carefully considered and programmed transition based on evidence-led studies and data concerning global climate change and necessary actions required to manage same.

Bord na Móna has a vast land bank totalling approximately 80,000 hectares, or 7% of the peatlands of Ireland. These lands, located mainly in the Midlands, represent not only one of the company's principal assets, but also an important resource for the nation as a whole. The publishing of Bord na Móna's *'Strategic Framework for the Future Use of Peatlands'* ('Strategic Framework') in 2011 initially set out the company's long-term commitment to the sustainable economic development of the Midlands region, for the benefit, and support of, its rural communities, through a mix of appropriate new uses, including renewable energy and other developments. Specifically, one of the key themes underpinning the Strategic Framework is the need to unlock the potential of extant and future cutover bog for renewable energy development in addition to other alternative uses such as amenity and tourism,

biodiversity and ecosystem services. The co-location of renewable energy infrastructure and other appropriate alternatives uses on cutover bog was considered a key driver in achieving a *'low carbon and climate resilient Ireland"*[17] within this early strategy.

2.2.6.1 Brown to Green Strategy 2018

Building on the objectives of the Strategic Framework, Bord na Móna announced its 'Brown-to-Green' Strategy in October 2018[18] which involves 3 no. key functions to support the company's transition from peat extraction to developing climate solutions in renewable energy, sustainable waste management, carbon storage and biodiversity conservation:

- Consolidate and simplify Bord na Móna's business structures in order to decarbonise and reposition the company as a renewable energy, resource recovery and low carbon sustainable business;
- Accelerate plans and the development of Bord na Móna's renewable energy and resource recovery businesses; and,
- The development of new sustainable businesses to support significant employment.

The implementation of the 'Brown-to-Green' Strategy between 2018 – 2020 resulted in both significant changes and progress in re-focusing and strengthening Bord na Móna's operations to renewable energy generation, recycling and the development of other low carbon enterprises. It also ultimately resulted in cessation of peat harvesting on all land owned by the applicant. Bord na Móna's formal announcement in January 2021 that all industrial scale peat extraction on lands within its management would permanently cease represents a milestone in the implementation of the 'Brown-to-Green' strategy, as indicated within the announcement[19] details,

> *"The Brown to Green strategy has involved the transformation of Bord na Móna from a traditional peat business into a climate solutions company... As we have put our new climate-focused business in place, we have also completely stopped a number of high carbon operations and transitioned others to a more sustainable model...Today marks the formal end to the company's association with peat harvesting, as we move on to tackle the critical challenges concerning climate change, energy supply, biodiversity and the circular economy."*
> - Chief Executive Tom Donnellan

Bord na Móna continues to progress its 'Brown-to-Green' Strategy on the basis of 4 no. core strategic actions):

- Provide Ireland with sustainable energy from renewable sources at scale;
- Effectively rehabilitate our peatlands;
- Deliver world-class waste and resource recovery solutions; and.
- Help Ireland reimagine how it engages with climate action.

As part of the 'Brown-to-Green' Strategy, the Ballivor Bog Group was identified as an optimal site for the provision of a wind farm development following a detailed site selection exercise of the existing Bord na Móna land bank. In April 2023, Bord na Móna Powergen Ltd lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarm.ie/). The proposed wind farm is located on Ballivor bog, Carranstown bog, Bracklin bog, Lisclogher bog and agricultural land adjacent to Bracklin bog. This application was made directly to An Bord Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Act. This position was confirmed by An Bord Pleanála in correspondence to the

[17] *Section 5.2.6 of 'Ireland 2040 Our Plan – Issues and Choices' (2016) – a paper issued in respect of public consultation for the National Framework Plan.*
[18] *Remarks by the Chief Executive of Bord na Móna to the Oireachtas Committee on Climate Action (13th November 2018)*
[19] *Source - https://www.bordnamona.ie/bord-na-mona-delivering-on-climate-action/*

Applicant dated 5th April 2022 following pre-application consultations with the Board under Section 37B of the Act (ABP-307471-20). A separate EIAR and accompanying NIS was undertaken for the proposed wind farm development. At the time of writing, a decision had not yet been made by An Bord Pleanála with regards this application.

Any future development proposals on site will be implemented in tandem with the rehabilitation of cutover peatlands to ensure environmental stabilisation of these bog sites and the optimisation of climate action benefits associated with the same. As required under their IPC Licence obligations (refer to Section 2.2.3 above), Bord na Móna must prepare and implement a rehabilitation plan for each of the bogs comprising the Ballivor Bog Group, following consultation with relevant stakeholders, as defined by Condition 10 of their licence (Ref. P0501-01):

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

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

10.1.2 Implement the agreed cutaway bog rehabilitation plan.

The discharge of Condition 10 will facilitate the permanent rehabilitation of the Application Site in conjunction with any parallel future end-uses (such as wind energy infrastructure). Chapter 4 (Description of the Development) of this rEIAR provides a more comprehensive review of the rehabilitation plans for the Application Site. The Cutaway Bog Decommissioning and Rehabilitation Plan for each bog can be found in Appendix 4-2.

2.2.6.2 Peatland Climate Action Scheme

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures with the primary aim of optimising climate action benefits of rewetting former industrial peat extraction areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. These measures are separate to those defined by the IPC Licence. This programme has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions. In addition, this will also benefit biodiversity and water (water quality and catchment management), as well as providing space for local communities and people to enjoy the outdoors. The scheme is supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see https://www.bnmpcas.ie/ for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC licence requirements and therefore does not form part of this Substitute Consent application and is being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures e.g., bogs such as Carranstown East, Lisclogher West and Bracklin West where PCAS is currently underway.

2.3 Planning Policy Context

This section of the chapter outlines the planning policy relevant to the subject works, including the historic planning policy (where available) that was in place at the time that the subject works were carried out, along with current policy where relevant. In some cases, it has not been possible to identify the relevant policies that were in place at the time relating to the subject works due to the historic nature of those policies. Where feasible, some historic policy documents have been sourced from various libraries and archives and are set out in Section 2.3.4 below.

2.3.1 National Policy

2.3.2 Climate Change Strategies

The use of peat as a power source in Ireland is coming to a close, however for a long period of time it was the main means by which power was generated en masse. The National Climate Change Strategy (2000) states the following with respect to the use of peat as a source of electricity:

> *"To the extent that peat continues to be used for power generation, its use will become more efficient with the commissioning of the new Clonbullogue plant in 2001, and the construction of two further new plants which will progressively replace all remaining, low efficiency, peat generation. These new plants will use the minimum amount of peat compatible with economic operation within the Public Service Obligation (PSO), and their construction, operation and management will be benchmarked on best industry practice to maximise the efficient use of peat"* p. 33.

Under the National Climate Strategy (2007), government policy was supportive of *"co-firing of biomass with peat in power generation as a means of reducing greenhouse gas emissions and introducing additional diversity into the fuel mix for power generation."*

The above extracts from the National Climate Strategies demonstrate the historic favourable outlook towards the use of peat for power generation in Ireland. Peat was viewed as a key component for diversifying the fuel mix for power generation whilst supporting rural economies where this peat was being extracted.

2.3.2.1 National Planning Framework (2018)

Ireland 2040 - National Planning Framework (hereafter referred to as the 'NPF') published by the Government in February 2018, is a 20-year planning framework designed to a focus on economic development and investment in housing, water services, transport, communications, energy, health and education infrastructure. The NPF forms the top tier of the national planning policy structure and establishes the policy context for the Regional Spatial and Economic Strategies and local level development plans.

The NPF notes that the population of Ireland is projected to increase by approximately 1 million people by 2040 which will result in a population of roughly 5.7 million. This population growth will place further demand on both the built and natural environment, and subsequently, the services required to meet said demands. In order to strengthen and facilitate more environmentally focused planning at the local level, the NPF states that future planning and development will need to:

> *"Tackle Ireland's higher than average carbon-intensity per capita and enable a national transition to a competitive low carbon, climate resilient and environmentally sustainable economy by 2050, through harnessing our country's prodigious renewable energy potential."*

The NPF set out key priorities at a regional level. Specifically, key priorities for the Eastern and Midland Region include:

- *Harnessing the potential of the region in renewable energy terms across the technological spectrum from wind and solar to biomass and, where applicable, wave energy, focusing in particular on the extensive tracts of publicly owned peat extraction areas in order to enable a managed transition of the local economies of such areas in gaining the economic benefits of greener energy.*
- *Building on the progress made in developing an integrated network of greenways, blueways and peatways, that will support the diversification of rural and regional economies and*

promote more sustainable forms of travel and activity based recreation utilising canal and former rail and other routes.

A key focus throughout the NPF is the fostering of a transition toward a low carbon, climate-resilient society,). The NPF references the National Climate Policy Position (superseded by the CAP 2024) which established the fundamental objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. As per **National Policy Objective 54,** the NPF highlights the importance integrating climate action within the national planning decision-making process, particularly the provision of renewable energy infrastructure and protection / enhancement of carbon sinks.

- ***NPO 54****: Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions.*

The **National Strategic Outcome 8** (*Transition to Sustainable Energy*) notes that in creating Ireland's future energy landscape, new energy systems and transmission grids will be necessary to enable a more distributed energy generation which connects established and emerging energy sources, i.e. renewables, to major sources of demand. The successful transition to a low-carbon power system will depend on the pillars of 1) *Sustainability*, 2) *Security of supply* and 3) *Competitiveness*. Ireland's national energy policy under **National Policy Objective 55** aims to '*promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050'*.

The NPF emphasises that rural areas, such as the Application Site, have a strong role to play in securing a sustainable renewable energy supply for the country and acknowledges that *"rural areas have significantly contributed to the energy needs of the country and continue to do so"*. In this regard, the NPF states:

> *"In meeting the challenge of transitioning to a low carbon economy, the location of future national renewable energy generation will, for the most part, need to be accommodated on large tracts of land that are located in a rural setting, while also continuing to protect the integrity of the environment*
>
> *Some of Ireland's cutaway bogs are suitable to facilitate the generation of energy, most notably wind/biomass".*

Notwithstanding the above national policy objectives, the NPF also considers the importance of investing within the rural communities and environs, which would ultimately support the national transition to a low carbon society (a precursor to the *Just Transition*). National Policy Objective 21 highlights the need to maximise the opportunity to link employment to issues such as climate change and managing sustainable land use:

- ***NPO 21****: Enhance the competitiveness of rural areas by supporting innovation in rural economic development and enterprise through the diversification of the rural economy into new sectors and services, including ICT based industries and those addressing climate change and sustainability.*

The future use areas such as the Application Site, is considered by the NPF as a key planning and place-making priority for the Eastern and Midland Region. Acknowledging the potential of these areas to facilitate specific and direct climate action measures (e.g. rehabilitation and the green energy sector), the NPF characterises Ireland's peatlands, and the opportunities associated with their future uses including socio-economic benefits, as enabling a managed transition to low carbon economies.

2.3.2.1.1 Project Ireland 2040 – Draft First Revision to the National Planning Framework

The draft NPF was published for consultation in July 2024. Within the draft NPF there is Government commitment to green and blue adaptation including nature-based solutions. The draft NPF specifically references making a just transition away from peat extraction. The draft NPF highlights that some of these bogs are *"suitable to facilitate the generation of energy, most notably wind/biomass*." In transitioning to a zero-carbon energy future the draft NPF calls for (inter alia) *"a shift from predominately fossil fuels to predominantly renewable energy sources".*

2.3.2.2 National Development Plan 2021 – 2030

The National Development Plan 2021 – 2030 (NDP) was published on the 4th October 2021 and sets out the major public investment projects, as identified by Government, which are to play a significant role in addressing the opportunities and challenges faced by Ireland over the coming years such as Covid-19, Brexit, housing, health, population growth, and most relevant to the Project, climate change. It is stated that the NDP 2021 – 2030 will be the *'largest and greenest ever delivered in Ireland'*, and in this regard, the NDP highlights that extensive consultation was undertaken to ensure that the plan adequately supports the implementation of climate action measures.

Reflecting on the recent publication of the IPCC's 6th Assessment Report, the NDP notes that the Irish Government is fully committed to *'playing its part'* to ensure that the worst climate change damage can be avoided, e.g. significant reductions in CO_2 and other greenhouse gas emissions as assisted by the achievement of both European and National renewable energy targets. Specifically, the NDP states that,

> *"The next 10 years are critical if we are to address the climate crisis and ensure a safe and bright future for the planet, and all of us on it.*
>
> *The investment priorities included in this chapter [Ch. 13] must be delivered to meet the targets set out in the current and future Climate Action Plans, and to achieve our climate objectives. The investment priorities represent a decisive shift towards the achievement of a decarbonised society, demonstrating the Government's unequivocal commitment to securing a carbon neutral future."*

Notwithstanding this, the NDP acknowledges that it is not its role to set out a specific blueprint for the achievement of Ireland's climate targets; but rather, facilitate capital investment allocations for the climate and environmental strategic priorities. For example, the Government has committed significant financial resources, supported by carbon tax revenues, to support the Midlands region through the *Just Transition* and will continue this programme of investment in the region over the coming years. The key focus of this investment is to support the transition of the existing workforces and the creation of new enterprise and employment opportunities associated with decarbonisation in order to provide a positive and enduring social impact.

One of the NDP's strategic investment priorities associated with the *Just Transition* is the conservation, restoration and management of Ireland's peatlands and other habitats in order to reduce carbon emissions; transition the lands towards carbon sequestration and strengthening their carbon storage potential. These projects will also provide natural capital opportunities pertaining to increased biodiversity, peatland amenity and eco-system services as well as improving water quality and attenuation. Another equally important opportunity concerning the *Just Transition* and Ireland's overall decarbonisation strategy is the need to establish a low-carbon, resilient electricity systems. As established within the CAP 2021, the NDP commits to increasing the share of renewable electricity up to 80% by 2030. This is characterised by the NDP as an '*unprecedented commitment to the decarbonisation of electricity supplies*' and will be an explicit driver for the deployment of new renewable generators and the expansion of the Irish green sector. While the rehabilitation (Condition 10 of IPC Licence) and future potential uses of the Ballivor Bog Group are not directly linked to the

NDP, the Project is representative of the national investment priorities set out therein, and therefore, the Plan establishes a strong precedent for the regularisation of the Application Site.

2.3.2.3 National Peatlands Strategy 2015 – 2025

The National Peatlands Strategy (NPS) was published in 2015 and serves as a long-term strategic framework within which Irish peatlands are managed in order to optimise their social, environmental and economic contribution to the well-being of current and future generations. The NPS sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning and agriculture. In this regard, decisions made in peatland management can ultimately contribute to or detract from the achievement of European and national objectives and obligations, including those concerning climate change and decarbonisation.

As discussed in CAP 2024, Irish peatlands provide a range of ecosystem services, and consequently, are considered amongst the most important ecosystems of the world due to their functionality concerning biodiversity, climate regulation, water filtration and supply, and with regard to economic, amenity, heritage merits and human welfare. In recent years, scientific research has established the importance of peatlands as carbon stores and natural mitigation against some of the projected impacts of climate change. Specifically, peatlands remove carbon from the atmosphere and store it in the form of peat., and by extracting carbon over long periods and by emitting other greenhouse gases such as methane, peatlands affect and regulate the global climate. Once degraded or cutover, (i.e. industrial scale extraction,) this regulatory system is reversed, and carbon dioxide is emitted as peat decomposes (and burned as a fuel source). The role of peatlands in the carbon cycle is therefore a key consideration in their future management and will inform Ireland's response to climate change.

The NPS states that the sustainable use of peatlands, as illustrated below in Figure 2-2, will optimise the contribution of different economic, social and environmental services that peatlands provide. Relevant to the future of the Application Site, the NPS emphasises that the after uses of cutover peatlands should be undertaken in a manner that minimises environmental damage, realises opportunities regarding environmental protection and enhancement and contributes to the State meeting its objectives and obligations relating to air, climate, water, nature and the environment. These objectives are captured in General Principles P2, P3 and P18 and Action A9 of the NPS:

- ***P2**: The potential economic, environmental and social benefits and costs of peatland uses will be considered and applied to policy and land use decisions.*
- ***P3**: The future management of Ireland's peatlands will ensure the protection of threatened peatland habitats in compliance with environmental laws.*
- ***P18**: Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in Bord na Móna's Strategic Framework for the Future Use of Peatlands*
- ***A9**: An examination of all publicly owned lands and privately owned cutaway will be undertaken with a view to identifying appropriate uses, which will aim to harness their potential to contribute to Ireland's environmental, ecological and economic wealth, with particular emphasis on mitigating carbon losses.*

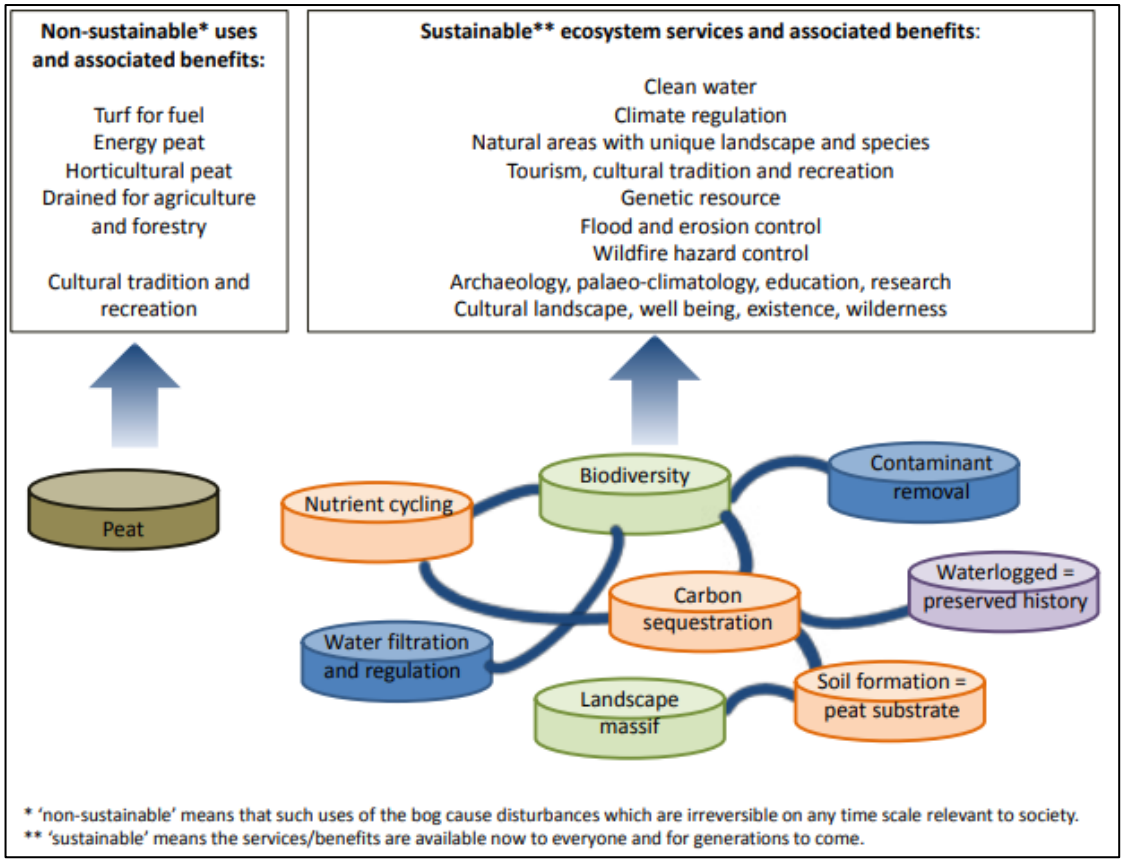


Figure 2-2. Use of Peatlands (National Peatland Strategy 2015)

In the context of climate action, the NPS states that, in identifying the most appropriate after use for cutover peatlands, consideration should be given to encouraging, where possible, the return to a natural functioning peatland ecosystem via re-wetting. The National Recovery and Resilience Plan, funded by the EU's Recovery and Resilience Facility, is allocating €108 million to the Enhanced Decommissioning, Rehabilitation, and Restoration Scheme (EDRRS). This initiative aims to restore around 33,000 hectares of peatlands across 82 Bord na Móna bogs, which were formerly utilised for peat extraction for electricity generation. The rehabilitation efforts are scheduled to span five years. The NPS also notes that cutover bogs have a number of advantages over other categories of land in terms of accommodating potential commercial wind farm developments. The rehabilitation and potential future uses of Ballivor Bog Group are considered compliant with the aims of the NPS and Principles P19, P20, P21 and P24 set out below:

- ***P19:*** *The potential contribution of peatlands rehabilitation, restoration and enhancement to climate change mitigation and adaptation, in addition to peatland preservation, will be fully explored.*
- ***P20:*** *As part of Ireland's commitment to move towards a cleaner, more carbon efficient economy, means to reduce the dependency on peat as a source of fuel and horticultural compost will be fully explored.*
- ***P21:*** *Consideration will be given to how best cutaway bogs can contribute to a low carbon economy through their use as sites for renewable energy.*
- ***P24****: Coillte and Bord na Móna as the managers of significant tracts of peatlands on behalf of the Irish people will continue to show leadership in responsible management, rehabilitation and restoration of peatlands.*

The peatland rehabilitation plans for the Application Site will facilitate the transition from peat extraction to peatland rehabilitation contributing to achieving the abovementioned policies. The regularisation of this Application Site through this substitute consent application is an important step in

facilitating potential future uses, including renewable energy, and thereby further contributing to ensuring these policies are achieved.

2.3.2.4 National Biodiversity Action Plan 2017 – 2021 (2017)

The National Biodiversity Action Plan 2017 – 2021 (NBAP) was published by the Department of Culture, Heritage and the Gaeltacht in 2017 and establishes an over-arching Government policy comprised of objectives, targets and actions aimed to achieve Ireland's Vision for Biodiversity,

> *"Biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally".*

As a Party to the UN Convention on Biological Diversity, Ireland has made a commitment to prepare Biodiversity Action Plans to contribute towards the Convention's targets: secure the conservation of biological diversity; sustainable use of its components; and the equitable sharing of the benefits arising out of the utilisation of genetic resources. In order to achieve these targets, the NBAP sets out 119 no. actions under a framework of 7 no. strategic objectives:

1. Mainstreaming biodiversity across the decision-making process in the State;
2. Strengthening the knowledge base underpinning work on biodiversity issues;
3. Increasing public awareness and participation;
4. Ensuring conservation of biodiversity in the wider countryside;
5. Ensuring conservation of biodiversity in the marine environment;
6. Expanding and improving on the management of protected areas and protected species; and,
7. Enhancing the contribution to international biodiversity issues.

The NBAP state that the main threats and pressures reported on EU protected habitats and species in Ireland, and consequently, the achievement of the above objectives, include climate change and peat extraction. Scientific research has indicated that that climate change is likely to become one of the most significant drivers of biodiversity loss by the end of the century (if not sooner as expounded by current literature). Building on the connection between climate change and cutover peatlands (e.g. the Ballivor Bog Group), the NBAP identifies the following actions targeting the protection and rehabilitation of peatlands to support national biodiversity:

- **Action 4.1.3**: Implement Bord na Móna's Biodiversity Action Plan 2016 – 2021; and,
- **Action 6.1.5**: Implement the National Peatland Strategy

The Interim Review of the Implementation of the NBAP 2017 – 2021 (dated February 2020) states that declines in Irish peatlands have been recorded in the 2019 global assessment on biodiversity and ecosystem services undertaken by the Intergovernmental Science-Policy Platform. However, recent actions directed towards the sustainable management of peatlands, such as Bord na Móna's on-going peatland rehabilitation work and cessation of industrial peat extraction, are acknowledged within the Interim Review as positive actions contributing to Ireland's Vision for Biodiversity, as noted above. The rehabilitation of the Ballivor Bog Group, in conjunction with any future uses, will allow the Application Site to contribute towards the achievement of relevant climate action and biodiversity objectives.

2.3.3 Regional Policy

The Eastern and Midlands Regional Assembly (EMRA) has a recognised leadership role in setting out regional policies and coordinating initiatives which support the delivery and implementation of the NPF. The primary vehicle for this is the preparation and implementation of the Regional Spatial and Economic Strategy (RSES), which was adopted by the elected members of the EMRA on the 28th June 2019. The Ballivor Bog Group is located within the administrative boundaries of Westmeath and Meath County Councils, which have been part of the EMRA since January 2015.

2.3.3.1 Eastern and Midlands Regional Spatial & Economic Strategy (2019)

The Eastern and Midlands Regional Spatial and Economic Strategy (RSES) s emphasises the need for a balanced approach under **Regional Strategic Outcome 10** (Enhance Green Infrastructure) which requires '*the **sustainable management** of strategic natural assets such as our coastlines, farmlands, **peatland**s, uplands woodlands and wetlands'*. Due to the physical geography of the Midland region and its abundance of agricultural, peatlands and wetlands, the 'sustainable management' of these strategic natural assets is identified by the RSES as a '*Growth Enabler'* for the Midlands. This requirement for proactive and sustainable management of peatland, for both socio-economic and climate action benefit, is set out in Regional Policy Objectives (RPO) 4.84 and 7.29 (underlined for emphasis),

> ***RPO 4.84***
>
> *"Support the rural economy and initiatives in relation to diversification, agri business, rural tourism and renewable energy so as to sustain the employment opportunities in rural areas. In keeping with the NPF, the Eastern and Midland Regional Assembly will support the longer term strategic planning for industrial peatland areas. This may include support, where appropriate, for a Transition Team in place and preparation of a comprehensive after-use framework plan for the peatlands and related infrastructure, which addresses environmental, economic and social issues, including employment and replacement enterprise reflecting the current transition from employment based around peat extraction."*
>
> ***RPO 7.29***
>
> *Support collaboration between local authorities, the Bord na Móna Transition Team and relevant stakeholders and the development of partnership approaches to integrated peatland management that incorporate any relevant policies and strategies such as the Bord na Móna Biodiversity Plan 2016-2021 and the national Climate Mitigation and Adaptation Plans. This shall include support for the rehabilitation and/or re-wetting of suitable peatland habitats.*

Having regard to the above regional policies and outcomes, the RSES identifies the diversification and growth of smart specialisation of local economies (including energy and renewables, bioeconomy and circular economy) with a focus on publicly owned peatlands in the Midlands as key to supporting the '*Just Transition'* and sharing the benefits of emerging green industries and technologies. In this regard, the RSES clearly acknowledges that the Region's current reliance on traditional power sources (e.g. fossil fuels such as coal, peat and oil-fired generators) is not a sustainable long-term strategy, and in light of the climate change emergency occurring both within Ireland and at a broader global scale, the establishment of a low-carbon power system based on renewable energy is necessary pre-requisite for future development.

> *"The Strategy supports an increase in the amount of new renewable energy sources in the Region. This includes the use of wind energy – both onshore and offshore, biomass, and solar photovoltaics and solar thermal, both on buildings and at a larger scale on appropriate sites in accordance with National policy and the Regional Policy Objectives outlined in this Strategy"*

Building on the above aim, the RSES identifies several key drivers required to support and facilitate the electricity generation via indigenous renewable sources:

- Facilitating the provision of appropriate renewable energy infrastructure and enabling technologies;
- Expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity; and,
- Moving from carbon intense fossil fuel generation to lower emissions fuels such as natural gas; and

- The need to ensure sufficient electricity to meet increased demand

The RSES supports an increase in the amount of new renewable energy sources in the Region in accordance with National policy and the RPOs outlined in this Strategy. The following RPOs ensure that regional energy resources are developed in a safe and secure way to meet projected demand levels, to meet Government Policy, to ensure a long-term, sustainable and competitive energy future for Ireland and enable energy service providers to deliver their statutory function:

- ***RPO 7.43*** *(Resilience of Critical Infrastructure): Climate Action Regional Offices and local authorities should consider the identification of critical infrastructure within their functional areas, and particularly of the interdependencies between different types of sectoral infrastructure, as a first step in 'future-proofing' services and to help to inform longer term adaptation planning and investment priorities; and,*
- ***RPO 10.20****: Support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the Region and facilitate new transmission infrastructure projects that might be brought forward in the lifetime of this Strategy; and*

The RSES references the increasing areas of cutaway peatlands within the region in the context of potential beneficial after-uses including renewable energy, biodiversity, amenity uses, water / carbon storage and other infrastructure. The majority of these proposed uses relate to both climate mitigation and adaptation measures and the need to ensure that land use changes do not impact on the ability of the natural environment to absorb climate impacts as per the following RSES Guiding Principles:

- Consideration of the potential contribution of peatlands to climate change mitigation and adaptation including renewable energy production;
- Consideration of the ecosystem services and tourism potential provided by peatlands; and,
- Development of peatlands shall ensure that there are no negative impacts on water quality.

This is in line with Bord na Móna's own vision for the peatland extraction areas such as the Application Site. The regularisation of the Application Site and the implementation of the rehabilitation plans will contribute to the abovementioned guiding principles.

2.3.4 Local Policy – County Development Plans

The Application Site is located within the functional areas of Westmeath County Council and Meath County Council, and therefore, the planning framework applicable to the Application Site would have been set out in the respective county development plans, once they came into force. The current Development Plans (Westmeath County Development Plan 2021 – 2027 and Meath County Development Plan 2021 – 2027) are set out in detail below while previous Development Plans are also set out in this section for context, where publicly available.

A review of the policy documents as outlined below illustrates that for the lifetime of all County Development Plans, the industrial uses of the Application Site were largely consistent with local planning policy. The industrial heritage of Bord na Mona was and is recognised as part of the cultural heritage of the landscape and as an important contributor to the rural economy. Alongside this, policies to support the eventual transition of the peatlands have been included in more recent Development Plans, acknowledging the ecological potential of the area as well as reflecting the emerging climate and energy goals.

2.3.4.1 Westmeath County Development Plan 2021 - 2027

The Westmeath County Development Plan 2021 – 2027) (WCDP) came into effect on the 3rd May 2021 and provides the strategic framework for land-use planning in the county. The WCDP is underpinned

by 11 no. Strategic Aims which, relevant to the Ballivor Bog Group, includes provisions for 'Climate Action', 'Natural Heritage and Green Infrastructure' and 'Rural', as summarised below:

> *"**Climate Action**: To transition to a low carbon and climate resilient County, with an emphasis on reduction in energy demand and greenhouse gas emissions, through a combination of effective mitigation and adaptation responses to climate change.*
>
> ***Natural Heritage and Green Infrastructure**: Continue to protect and enhance the County's natural heritage and biodiversity and ensure that networks of green infrastructure are identified, created, protected and enhanced to provide a wide range of environmental, social and economic benefits to communities.*
>
> ***Rural**: To support the role of rural areas and the countryside in sustaining the rural economy and improved connectivity, broadband and rural economic development opportunities through the development of the agricultural and agri-food sector, agricultural related developments and enterprises, including diversification of the rural economy, forestry, energy production, tourism, recreation, mineral extraction and/other new and emerging rural based enterprises, all within the context of the sustainable management of land and resources"*

Chapter 12 (Natural Heritage and Green Infrastructure) of the WCDP states that Westmeath supports a wide range of habitat types and landscapes including peatlands, which are described as being a characteristic part of the landscape covering about 17,000ha (c. 9% of the footprint of the county). Westmeath County Council recognises that peatlands are one of the oldest surviving ecosystems, and furthermore, are considered amongst the most important ecosystems due to their value for biodiversity, regulation of climate as a valuable natural carbon sink, water filtration and supply. Specifically, the WCDP highlights that 'natural state' peatlands function as long-term sinks for atmospheric carbon dioxide and are the 'most important long-term carbon store in the terrestrial biosphere'. Given the extent of peatland in Westmeath (including the Application Site), the WCDP acknowledges that considerable potential exists to use these lands as a resource to mitigate against the impacts of climate change (e.g. rehabilitation), as reflected in the below policy objectives, in addition to socio-economic benefits relating to green industries and technologies.

- ***CPO 11.6 / CPO 12.69:** Support collaboration between local authorities, the Bord na Móna Transition Team and relevant stakeholders and the development of partnership approaches to integrated peatland management for a just transition that incorporate any relevant policies and strategies such as the Bord na Móna Biodiversity Plan 2016-2021 and the national Climate Mitigation and Adaptation Plans. This shall include support for the rehabilitation and/or re-wetting of suitable peatland habitats.*
- ***CPO 12.2**: Support the implementation of any relevant recommendations contained in the National Biodiversity Plan, the All Ireland Pollinator Plan and the National Peatlands Strategy.*
- ***CPO 12.66**: Exercise control of peat extraction, both individually and cumulatively, which would have significant impacts on the environment, in accordance with legislative provisions, in the interest of protecting and enhancing biodiversity and addressing climate change.*
- ***CPO 12.67**: Work in partnership with relevant stakeholders on suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment, where relevant.*

The significance given to peatlands and their role within the preservation of biodiversity and ecosystem services is in line with the Bord na Móna's own understanding and vision for Ballivor Bog Group and supports the regularisation of the planning status of the Application Site in conjunction with the rehabilitation measures required under IPC Licence (Ref. PO501-01).

The WCDP identifies 'Transition to a Low Carbon Economy / Green Economy' as Guiding Principle 5 for economic development within the county. The Green Economy has been identified by Westmeath County Council as an area of significant growth with potential for notable enterprise and employment

creation within the county, including new sectoral opportunities associated with research and development, innovation and clean technology products and solutions. Support for the establishment of a Westmeath Green Economy is based on recent climate change legislation and scientific literature, including the national Climate Action Plan 2019 (superseded), the Paris Agreement and the research completed by the Intergovernmental Panel on Climate Change.

The WCDP's Chapter 9 (Rural Westmeath) also states that the Council will continue to support and encourage the role of rural areas in sustaining the rural economy with reference to energy production and carbon reduction and/or other new and emerging rural based enterprises (in line with the active implementation of *Just Transition* measures across the region). Relevant to the Ballivor Bog Group, the following policy objectives are identified in support of this guiding economic principle:

- ***CPO 5.51****: Ensure that the County is well positioned to capitalise on the economic benefits associated with the transition to a low carbon economy;*
- ***CPO 5.52****: Support enterprise development and employment creation across all sectors of the Westmeath economy in accordance with the Green Economy national frameworks relevant to each sector.*
- ***CPO 5.58****: Support rural diversification through sustainable rural development practices, investment in rural towns and villages, providing for access to technology and skills development networks;*
- ***CPO 5.59****: Support Renewable energy initiatives that supports a low carbon transition; and*
- ***CPO 9.34****: Support the rural economy and initiatives in relation to diversification, agri business, rural tourism and renewable energy so as to sustain employment opportunities in rural areas.*

As indicated above, the WCDP clearly supports the sustainable management of peatlands in order to protect the county's natural heritage, archaeological and non-renewable resources and contribute to Ireland's climate action strategy. The following policies support the Council's overarching aim for the future use of peatlands within the county (including renewable energy infrastructure) and are considered particularly relevant to the regularisation of the peat extraction works and all associated activities undertaken within the Application Site:

- ***CPO 10.139:*** *Support local, regional, national and international initiatives for limiting emissions of greenhouse gases through energy efficiency and the development of renewable energy sources which make use of the natural resources in an environmentally acceptable manner and having particular regard to the requirements of the Habitats Directive.*
- ***CPO 10.140:*** *Facilitate measures which seek to reduce emissions of greenhouse gases and support the implementation of actions identified in the Westmeath County Council Climate Change Adaptation Strategy 2019-2024 and any future amendments.*
- ***CPO 10.145****: To strictly direct large-scale energy production projects, in the form of wind farms, onto cutover cutaway peatlands in the County, subject to environmental, landscape, habitats and wildlife protection requirements being addressed.*

2.3.4.2 Westmeath County Development Plan 2014-2020

The Westmeath County Development Plan 2014–2020 came into force on the 18th of Feb 2014. This Plan has now expired. Contents of the Plan relevant to the Application Site include the noted Strategic Aims of:

- *Supporting the role of rural areas and the countryside in sustaining the rural economy and its role as a key resource for agriculture and agri-food, forestry, energy production and reduction, tourism, recreation, mineral extraction and/or other new and emerging rural based enterprises.*
- *Supporting and promoting the growth and development of the renewable energy sector in the county.*

- *Protecting the county's natural assets by maintaining and/ or improving the quality of the lakes, water and groundwater, landscape, parks, open spaces, architectural, archaeological and cultural heritage and material assets.*
- *Facilitating and supporting the development of Westmeath as a premier location for outdoor recreational activities including walking, cycling, fishing, boating, eventing and athletics centred upon a high-quality environment and carefully managed landscapes.*

Chapter 5 Natural and Built Heritage contains the following relevant policies:

- ***P-PTL1**: To protect the county's designated peatland areas and landscapes, including any historical walkways through bogs and to conserve their ecological, archaeological, cultural, and educational heritage.*
- ***P-PTL4:** To plan and prepare for the future sustainable and environmentally sensitive use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs, including habitat creation, in conjunction with adjacent Local Authorities. This plan will have regard to both National and Regional frameworks with regard to the future use of peatlands, including cutaway bogs.*
- ***P-PTL5:** To exercise control of peat extraction, both individually and cumulatively, which would have significant impacts on the environment.*

It is a stated Plan objective of Westmeath County Council to:

- ***O-PTL2**: To investigate the planning status of peat extraction in North Westmeath and to take appropriate enforcement action where appropriate.*
- ***O-PTL3:** To work with other bodies such as the NPWS and Coillte to support the conservation of peatlands.*
- ***O-PTL5:** To work in partnership with relevant stakeholders on suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment, as appropriate.*
- ***O-PTL6:** To support the preparation of a Sustainable Holistic Management Plan for the future use of the Industrial Peatlands in the county, which recognises the role of peatlands in carbon sequestration.*

Industrial Heritage is set out in the following policy and objective:

- ***P-IH1** :To protect buildings, features and the setting of industrial sites and their heritage and to encourage their sensitive restoration, consistent with the Department of Arts, Heritage & the Gaeltacht Guidelines.*
- ***O-IH1**: To prepare an inventory, survey and record of the county's industrial heritage during the lifetime of the plan and raise awareness of the value of same through the Heritage Plan.*

Chapter 10 Energy and Communications notes the shift to renewable energy within the Plan:

- ***P-EN1:** To promote renewable forms of energy where it is consistent with the proper planning and sustainable development of an area.*
- ***P-EN5:** To support the sustainable development of the infrastructure required to assist the Midland Region in the delivery of renewable energy, particularly in the context of the need to make a transition from peat to renewable energy.*

The Plan reflects the evident shift to a focus on renewable energy while showing a appreciation for the historic associations of the peat extraction industry within the Plan area.

2.3.4.3 Westmeath County Development Plan 2008–2014

The 2008-2014 Development Plan was adopted on the 25th of Jan 2008 and came into effect on the 25th of Feb 2008. Contents of the Plan relevant to the Application Site include:

Natural Heritage

- ***O-EH2:*** *To protect, manage and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath in recognition of its importance as a non-renewable resource, unique identifier and character of the county and as a natural resource asset.*
- ***O-EH3:*** *It is a key objective to ensure as far as possible that development does not impact adversely on wildlife habitats and species. In the interests of sustainability, b*
- ***P-EH19:*** *It is the policy of Westmeath County Council to ensure the conservation of the county's peatlands in order to minimise the negative impact on natural diversity and the archaeological and cultural heritage of the county.*
- ***O-EH14:*** *To conserve peatlands and protect peatland landscapes within the county. O-EH15: To continue to identify and map peatland sites of high local ecological value and protect them for their biodiversity.*
- ***O-EH16:*** *To exercise control of peat extraction both individually and cumulatively which would have significant impacts on the environment as provided for under SI 364 of 2005. O-EH17: To monitor applications for waste permits and other developments within and in close proximity to peatlands.*
- ***O-EH18:*** *To seek hydrological reports for significant developments within and in close proximity to peatlands so as to assess impacts on integrity of peatland ecosystems.*
- ***O-EH19:*** *To plan and prepare for the future use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs. There is potential for habitat creation such as woodlands, grasslands, and wetlands. There is also potential for amenity value with development of parklands and economic uses such as agricultural grasslands, forestry and wind energy.*
- ***O-EH20:*** *To work with other bodies such as NPWS and Coillte to support the conservation of Peatlands.*

Future of Cutaway Peatland

- ***P-EH32:*** *Within the next 20–30 years large areas of peatland will be exhausted and provide tracts of land that have potential for agriculture, habitat and amenity. The Council, in consultation with relevant agencies, will explore future potential of cut away peatlands that may offer opportunities for habitat creation or amenity and recreation areas such as community woodlands or parklands.*

Windfarms

- ***P-EH33*** *The occurrence of extensive cutaway peatland offers opportunities for siting of windfarms.*

Renewable Infrastructure

- ***P-IF16:*** *It is the policy of the Planning Authority to promote renewable forms of energy where it is consistent with the proper planning and sustainable development of an area.*
- ***P-IF17:*** *It is the policy of the Council to favour the use of renewable energy as a contribution to the energy demand of all new buildings.*

The focus of this Plan was clearly on transition; from peat extraction to reuse of these areas. The Plan features dedicated policies regarding the future of cutaway peatlands, which in itself demonstrates the importance of the industry to the Plan area. The forward-looking aspect of many of the Plan provisions paves the way for future Plans and applications.

2.3.4.4 Westmeath County Development Plan 2002–2008

The 2002-2008 Development Plan was adopted by the Council at a meeting held on the 15th of April 2002 and came into effect 4 weeks later. The following extracts from the Plan are considered relevant to this application:

Employment and Industry

> *"A specific objective to promote employment is the provision of zoned and service lands where appropriate to cater for the industrial, manufacturing, technological and service needs of the County.*
>
> *The Council will co-operate with Enterprise Ireland in the promotion and growth of indigenous and natural resource companies within the County."*

The above statement highlights a specific objective to promote employment, which aligned directly with the role of the Ballivor bog in providing jobs. This shows that the bog's operations are in line with broader employment goals for the county. The reference to the provision of zoned and serviced lands indicates that the county is committed to facilitating industrial and manufacturing activities. This supports the idea that the Ballivor bog, as a site for industrial activity, fits within the county's planned land use and development strategy.

Extractive Industry

The CDP outlines the following policies in relation to extractive industries:

> *"The Council recognises the importance of extractive industry in the economic life of the County, and importance as a valuable source of employment in parts of the County."*

This policy highlights the favourable outlook of the Council on the economic importance of extractive industries in the County at the time. This industry provided both employment and economic benefits to the county.

> *"The Council will facilitate the exploitation of the County's natural resources where there is proven need for a certain mineral/aggregate."*

The policy above demonstrates that the Council were in favour of the extraction of peat at Ballivor bog as peat was considered an important source of energy and fuel at the time of writing this CDP.

Bogs

The CDP states the following in relation to bogs.

> *"The importance of bogs has been communicated more widely to the general public, in recent years, nowadays it is generally recognised that bogs contain a unique record of our past and that they are important habitats with sore of the oldest communities dating back more than 10,000 years."*
>
> *"Raised bogs dominate the type found in County Westmeath and are the most important remaining in Europe and probably the most extensive of their type in the world. The Council will work with statutory and other agencies to ensure the level of protection afforded is adequate."*
>
> *"Since the last review of the Development Plan for large areas of bog which were considered of scientific interest have been downgraded and are no longer of interest because of they have been exploited for peat."*

"The Council recognises the importance of bogland as a major natural resource of rare material which is secondary to their importance for heritage and amenity value, The Council will lose with governmental and non-governmental organisations to ensure that the productive development of bogland is carried out in such a way as not to prejudice amenity potential."

2.3.4.5 Westmeath County Development Plan 1994

The Westmeath CDP 1994 was examined with regard to the Application Site and the following extract from the CDP is considered of relevance to the Application Site.

Bogland Development

"The council recognises the importance of boglands as a major natural resource being raw material for power generation and peat production and also constituting an important amenity resource. The Council will consult with Bord na Móna, Teagasc and other appropriate bodies to ensure that the productive development of the bogland is carried out in such a way as not to prejudice amenity potential. In particular, the Council shall co-operate with all interested parties in furthering the preservation of Scraw and Gariskil Bogs which are rated of international importance. In cases where bog development is likely to adversely affect public roads, charges will be levied on developers to defray the improvement/maintenance of such roads."

The extract above indicates that WMCC recognised the importance of peatlands as a natural resource for energy production and employment. Furthermore, it highlights the desires of the council to maintain the bogs as much as possible to ensure future uses in the post peat production stage are possible.

2.3.4.6 Westmeath County Development Plan 1986

The Westmeath CDP 1986 was examined with regard to the Application Site.

The CDP states the following in relation to employment:

"4,700 people were employed in the extractive and agriculture sectors in 1984. This was 23% of the total employed population of Westmeath (20,390). There was a 9.4% decrease in workers from 1979 when there were 5,200 employees in the sector."

Boglands

"The council recognise the importance of boglands as a major natural resource being raw material for power generation and peat production and also constituting an important amenity resource. It is the policy of the council to encourage the continued development of these areas while at the same time preserving the ecological balance in recognised areas of scientific interest."

The above extract outlines clear support for the development of boglands in the County at the time of writing. Consideration for the preservation of bogland for potential future uses is also demonstrated.

2.3.4.7 Meath County Development Plan 2021 – 2027

The Meath County Development Plan 2021 – 2027 (MCDP) came into effect on the 3rd November 2021 and sets out the policies, objectives and the overall strategy for the development of the County over the plan period 2021-2027. The Core Strategy (Chapter 2) of the MCDP identifies climate change as a cross-cutting theme underpinning the plan; and consequently, it is acknowledged that Meath County Council has a central role in supporting the implementation of climate action measures set out at the European and National levels of governance (i.e. the European Green Deal (Section 2.2.1.1) and

Climate Action and Low Carbon Development Act (2015) and Just Transition Fund (Section 2.2.1.2). The overarching climate change objectives set out with the MCDP are generally in line with the higher tier legislation with reference to the Climate Action Plan 2019 generally interchangeable with revisions to the climate action plans introduced since the Climate Action Plan 2019:

1. To support the implementation of the Climate Action Plan 2019 and to facilitate measures which seek to reduce emissions of greenhouse gases in the Electricity, Enterprise, Built Environment, Transport, Agriculture and Waste sector; and
2. To support the implementation of the Climate Action Plan 2019 and the National Climate Change Adaption Framework Building Resilience to Climate Change 2012 through the County Development Plan and through the preparation of a Climate Change Adaptation Plan in conjunction with all relevant stakeholders

Drawing on the NPF, RSES and the National Peatlands Strategy 2015 – 2025, the MCDP highlights the connection between the sustainable management of peatlands and climate action benefits including biodiversity support and ecosystem services. Noting that the environmental and heritage resources of the County are vital resources, the MCDP defines these assets as Green Infrastructure (underlined for emphasis),

> *"Strategically planned and managed network featuring areas with high quality biodiversity (uplands, wetlands, peatlands, rivers and coast), farmed and wooded lands and other green spaces that conserve ecosystem values which provide essential services to society"*

The Meath County Council states that some cutover peatlands have the potential to facilitate various complimentary activities such the generation of renewable energy, diverse ecosystems and places of public amenity, which are captured within the following policies below:

- ***HER POL 55**: To recognise the economic, social, environmental and physical value of Green Infrastructure*
- ***HER OBJ 39**: To work in partnership with relevant stakeholders on a suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment Screening, as appropriate, having regard to local and residential amenities*
- ***INF POL 35**: To seek a reduce greenhouse gas emissions through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principles;*
- ***INF OBJ 39**: To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.*

With regard to INF OBJ 39 and the potential to capitalise on new and emerging opportunities associated with decarbonisation and the low carbon economy, the MCDP notes the importance of establishing a Green Economy within Meath to ensure that the county remains competitive going forward. The MCDP defines the 'Green Economy' as a wide range of sectors that have a common objective of '*providing goods and services in a sustainable way that reduces impact on the environment and contributes to the circular economy'* such as Bord na Móna as a '*climate solutions'* company. The growing emphasis on reducing greenhouse gas emissions and improving resource efficiency now presents a major opportunity for indigenous enterprises to grow and export innovative products and services, particularly in rural areas (e.g. Ballivor Bog Group) where the MCDP intends to promote and encourage economic development to meet the needs of rural areas.

- ***ED POL 19:*** *To support and facilitate sustainable agriculture, agri-food, horticulture, forestry, renewable energy and other rural enterprises at suitable locations in the County.*

The MCDP aims to recognise and develop the full potential of green energy within the county for energy production / manufacturing and the export of green electricity to the national grid. The Plan also seeks to support industries and business which seek to generate energy within the confines of their specific sites and the export of surplus energy to the national grid. The regularisation of the planning status of the peat extraction works and all associated activities undertaken at the Application Site is the first step in ensuring the sustainable use and management of the Application Site, and therefore, in line with the above objectives.

2.3.4.8 Meath County Development Plan 2013-2019

The Meath County Development Plan 2013-2019 was adopted on 17th December 2012 and came into effect on 22nd January 2013. This plan has now expired and has been replaced the Meath County Development Plan 2021 – 2027. Section 8.1.3 of this plan outlines the Planning Authority's commitment to pursuing sustainable energy policies in accordance with the White Paper, 'Towards a Sustainable Energy Future for Ireland 2007-2020'. This plan recognised "*the range of new and developing technologies that can contribute to minimising greenhouse gas emissions and to securing a greater proportion of our energy needs from renewable sources".*[20]

Onshore wind was specifically identified as a potential renewable energy option for the county and it was an objective of this Plan for Meath County Council to "*investigate the potential of renewable energy identified in the initial assessment areas with a view to developing a renewable energy strategy for the County."*[21]

The CDP outlines the following policies and objectives in relation to peatlands:

- ***NH POL 11:*** *To seek to ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, archaeological, cultural and educational significance.*
- ***NH OBJ 4:*** *To work in partnership with relevant stakeholders on a suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment Screening as appropriate.*

These policies and objectives indicate that the extraction of peat as a fuel source is coming to an end which aligns with the production period at the Application Site. The CDP demonstrates that there are many potential future uses at the Application Site in the post production period.

2.3.4.9 Meath County Development Plan 2007-2013

The Meath County Development Plan 2007-2013 was adopted on 2nd March 2007 and came into effect on Thurs 22nd March 2007. This Plan has now expired. Contents of the Plan relevant to the Application Site include:

Chapter 8 Cultural, Heritage & Landscape Protection

- ***HER POL 102*** *To have regard to the natural and cultural heritage of the county in the pursuit of objectives relating to the provision of transport infrastructure.*
- ***HER POL 104*** *To avoid the location of Telecommunications Antennae & Support Structures, Windfarms, Largescale Enterprise, Extractive Industries and other such visually obtrusive*

[20] *Meath County Development Plan 2013-2019, pg. 155*
[21] *Meath County Development Plan 2013-2019, pg. 156*

structures or activities in fragile landscapes such as areas of Special Visual Quality or archaeological heritage, where views and / or prospects are to be preserved and in areas adjacent to national monuments, archaeological sites or listed buildings or structures.

Peatlands

- ***HER POL 18:*** *To ensure that peatland areas which are designated (or proposed for designation) as NHAs or SACs are conserved and managed appropriately to conserve their ecological, archaeological, cultural and educational significance.*
- ***HER POL 55*** *To protect archaeological sites, monuments (including their setting), underwater archaeology and peatlands, and objects within the jurisdiction of Meath County Council, including those that are listed in the Record of Monuments and Places or newly discovered sub-surface archaeological remains.*

Heritage

- ***HERITAGE SP: 1*** *To protect the physical landscape and visual character of the County.*
- ***HER POL 88:*** *To encourage the continued sustainable development of rural communities without compromising the physical, environmental, natural and heritage resources of the county*
- ***HERITAGE SP 2:*** *To protect the historic and archaeological landscapes of the County.*

2.3.4.10 Meath County Development Plan 2000 (Draft)

The draft Meath CDP 2000 was examined as the final published version of the Plan could not be sourced. The CDP outlines the following in relation to Ballivor and peatlands.

Employment

- *"The NEC electronics component factory in Ballivor is a major employer within the village and additional employment is provided in the nearby Bord na Mona peat works"*

It is clear that MCC recognised the importance of Ballivor bog as a major source of employment in the Ballivor area. This allowed for the rates of unemployment being low locally.

Landscape Sensitivity

Table 2-4: Draft Meath County Development Plan 2000 – landscape sensitivity

Characteristics	Sensitivities
Areas VQ10: Bogland Areas ***These areas, primarily to the west of Ballivor and Bohermeen are relatively isolated visually and functionally. They are difficult to penetrate and in the case of the Ballivor bog, are working peat extraction centres.***	*These areas are by virtue of their insular qualities are not sensitive to development such as masts, wind energy complexes and cut away bog uses such as major afforestation.*

The landscape assessment of MCC of the Ballivor bog would indicate that although the employment of people in peat extraction locally was important, they also had a view of potential future uses of the bog for infrastructure such as *"wind energy complexes"*.

2.3.4.11 Meath County Development Plan 1994

The 1994 Meath CDP was examined for policies and information relating to Ballivor, the rural economy and peatland management.

Industrial Development

> *"The Planning Authority will facilitate and encourage the development and expansion of existing industry and the development of new industry at appropriate locations. The Council intends to acquire land and develop sites as necessary, as part of its on-going commitment to the reduction of unemployment levels in the County. It is envisaged that the majority of new job creating enterprise will be located in existing development centres where services are available. However, the Planning Authority accepts that many sites exist in rural areas suitable for industry and industrial expansion. Where proposals are received for development in such areas, regard shall be had to the locational requirements of the particular industry and to tourism and amenity interests and the requirements of established uses."*

It is clear that MCC viewed the existing industrial employment associated with Ballivor bog as being an important employer in the county and were in favour of the creation of additional jobs as an existing industry.

Industrial Development and Employment

> *"In a national context of job creation, the Council's function is both to ensure the provision of adequate infrastructural facilities and to actively participate in the acquisition and development of sites where appropriate. Meath like other counties has experienced and will continue to experience a continuous decline in the numbers engaged in agriculture. Future employment opportunities are therefore necessary from the industrial and service sectors."*

As demonstrated by the above extract, the importance of employment in the industrial sector was of paramount importance at the time due to the decline of numbers employed in agriculture. The peat extraction activities at Ballivor Bog led to reduced unemployment due to the increased mechanisation in the agriculture sector.

Industrial/Commercial Development

> *"The Planning Authority recognises the economic and employment related importance of commercial and industrial development. The potential for such activities to reinforce designated development centres is also recognised. The Planning Authority will facilitate implementation of a programme for industrial development in County Meath."*

The support for increased employment in existing and new industrial and commercial industries is evident from the extract above. This further highlights MCC's positive view on the employment associated with Ballivor Bog at the time.

Mining and Extractive Industries

> *"Mining, quarrying and mineral exploitation contributes significantly to the economic development of the county and provides substantial levels of employment"*

Although the quote above does not mention peat extraction, it is also considered an extractive industry. This quote further highlights MCC's view of the importance of employment at Ballivor bog at the time.

Peat Extraction

> *"The development of peat resources will be promoted and facilitated. However the Planning Authority will fully support the retention of particular sites worthy of preservation such as Lough Shesk, 7km south of Crossakeel, which is considered to be a fen of international importance. Also, the possible development of bogs for tourist related purposes will be facilitated."*

This extract further highlights MCC's positive view on the development of bogs in the county at the time. Furthermore, MCC outlined the possibility of future uses at the bog such as tourism. This demonstrates the importance of Ballivor bog as a potential current and future employment resource for the County.

2.3.4.12 Ballivor Development Plan 1993

This Plan is a statutory Development Plan made pursuant to the provisions of the Local Government (Planning and Development) Acts 1963 – 1993.

Background

> *"Ballivor probably owes its origins to its role as a local centre of trade and fairs, traditionally drawing on the pasture lands that surround it. Today it is supported by modern industrial development. It is a distinctive village with a uniform grouping of two storey structures on opposite sides of the Main Street at its centre and more recent low density development on its approaches. Of particular note are the Protestant and Catholic Churches built in 1820 and 1821 respectively which command opposing sites at the centre. The Village is defined in the County Development Plan as a local centre in the Trim Development District. It is located on the Dublin - Mullingar Regional route, 14 km from Trim and 13 km from Athboy."*

Employment

> *"The N.E.C electronics component factory in Ballivor is the mainstay of employment in the village. Some employment is also provided at the nearby Bord Na Mona peat works and in a variety of commercial premises in the village. Total employment offered is substantial relative to the villages population. This indicates that the village provided employment for surrounding areas."*

The text above demonstrates that the importance of Ballivor as a local hub of employment in rural Meath. Due to the employment opportunities available in Ballivor bog and the electronics components factory, the bog contributed substantially to local employment, which is crucial for economic stability in the village and surrounding areas. Furthermore, the assertion that total employment offered is substantial relative to the village's population indicates that the village not only supports its residents but also those from surrounding areas. This can be used to emphasise the regional importance of the bog's operations. Overall, the statement provides a clear linkage between the Ballivor bog and the economic well-being of Ballivor and its surroundings.

Industry

> *"The employment provided in the village by industrial activity, is crucial to the development of the town in the long term. Subject to normal development control and the policies of this plan, it will be the strategy of the plan to facilitate appropriate expansion of existing industry."*

The statement emphasises that industrial activity was/is crucial to the long-term development of the village. This implies that the continuation and expansion of industrial operations, such as those at the Ballivor bog, are essential for sustained economic growth and stability in the area. Moreover, it mentions that the strategy of the plan is to facilitate the appropriate expansion of existing industry, subject to normal development controls and policies. This shows that the potential future uses at the bog aligns with local development policies and strategies.

2.3.4.13 Meath County Development Plan – Local plans for towns and villages 1981

The dedicated chapter on Ballivor in the Meath CDP – Local Plans for Towns and Villages 1981 was reviewed to provide context to the surrounding area of Ballivor Bog Group and its impact on the receiving environment at the time.

Employment and Industry

> *"Before the arrival of the electronics factory which provides good male and female job opportunities in manufacturing industry, employment was mainly to be found in the nearby Bord na Mona Bog, in agriculture and in the service sector."*

Industry

> *"The recently established electronics factory and Bord na Mona are the main sources of industrial employment in the area. As the population and more people become available to take up industrial jobs, the County Council will facilitate the establishment of additional industry."*

The above statements highlight the significance of Ballivor Bog as an industrial employment hub for the local population of Ballivor Village during that period.

Planning Policy Conclusions

As demonstrated by the strategic policies and objectives set out, national, regional and local planning policy, the investment in, and implementation of, climate action measures to achieve cross-sectoral decarbonisation and the establishment of low carbon economies through increased renewable energy generation is a key pre-requisite in achieving Ireland's binding climate change targets and net zero carbon energy system by 2050. These policy documents also provide support for the activities which took place at Ballivor Bog Group during its production period as it provided essential employment to rural areas whilst facilitating power generation. The regularisation (without prejudice) of the peat extraction works and all associated activities along with the remedial measures (set out in Chapter 4 of the rEIAR) at the Application Site is considered consistent with the overarching planning framework set out in the abovementioned policy context. The rationale for this conclusion is based on the following:

National

- The Climate Action Plan 2024 aims to deliver a step-change in Ireland's emissions performance over the coming decade in line with European Green Deal such that EU targets for 2030, and beyond, are met. The CAP 2024 explicitly states that the achievement of the established emission targets will require sustained effort across sectors including the reduction of emissions in electricity generation and Land Use, Land Use Change and Forestry which includes peatland management. The rehabilitation of Ballivor Bog Group and the progress of potential future-uses (renewable energy infrastructure), subject to favourable consideration by the Board, will contribute to the successful implementation of the climate actions concerning the decarbonisation of the electricity and LULUCF sectors, including rehabilitate 65,000 hectares of peatlands, and potentially contributing the target of up to 8GW of on-shore wind energy. The rehabilitation of the Ballivor Bog Group (as per Condition 10 of Bord na Móna's IPC Licence), and the regularisation of the planning status of the Application Site, will directly contribute to the Just Transition efforts within the region concerning new opportunities associated with future uses.

- A key focus throughout the National Planning Framework (NPF) is the fostering of a transition toward a low carbon, climate-resilient society as exemplified by Objective 54, '*Reduce our*

carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions'. The future use of publicly owned peat extraction areas, such as the Ballivor Bog Group, is considered by the NPF as a key planning and place-making priority for the Eastern and Midland Region. Acknowledging the potential of these areas to facilitate specific and direct climate action measures (e.g. rehabilitation and the green energy sector), the NPF characterises Ireland's peatlands, and the opportunities associated with their future uses including socio-economic benefits, as enabling a managed transition to low carbon economies.

- One of the NDP's strategic investment priorities associated with the Just Transition is the conservation, restoration and management of Ireland's peatlands and other habitats in order to reduce carbon emissions. Another equally important opportunity concerning the Just Transition and Ireland's overall decarbonisation strategy is the need to establish a low-carbon, resilient electricity systems. While the rehabilitation (Condition 10 of IPC Licence) and future potential uses of the Ballivor Bog Group are not directly linked to the NDP, the proposed rehabilitation plans would contribute to the conservation, restoration and management of Ireland's peatlands while the regularisation of the Application Site will allow for potential future renewable energy development and represents an opportunity to further the overall reduction in Ireland's carbon emissions, in line with the priorities associated with the Just Transition set out in the NDP.

- The National Peatlands Strategy (NPS) serves as a long-term strategic framework within which Irish peatlands are managed in order to optimise their social, environmental and economic contributions. Relevant to the future of the Ballivor Bog Group, the NPS emphasises that the after uses of cutover peatlands should be undertaken in a manner that minimises environmental damage, realises opportunities regarding environmental protection and enhancement and contributes to the State meeting its objectives and obligations. The rehabilitation of the Ballivor Bog Group, in conjunction with any future uses, are considered compliant with the aims of the NPS and will allow the Application Site to contribute towards the achievement of relevant climate action and biodiversity objectives set out within the National Biodiversity Action Plan 2021 – 2021.

Regional

- The Eastern and Midland Regional Spatial and Economic Strategy (RSES) emphasises the need for the sustainable management of strategic natural assets such as our coastlines, farmlands, peatlands, uplands woodlands and wetlands. This requirement for proactive and sustainable management of peatland, for both socio-economic and climate action benefit, is set out in Regional Policy Objectives (RPO) 4.84 and 7.29. The RSES references the increasing areas of cutaway peatlands within the region in the context of potential beneficial after-uses including renewable energy, biodiversity, amenity uses, water / carbon storage and other infrastructure. The majority of these proposed uses relate to both climate mitigation and adaptation measures and the need to ensure that land use changes do not impact on the ability of the natural environment to absorb climate impacts. This is in line with the Bord na Móna's own vision for the 'Rethinking, Renewal and Restoring' of peatland extraction areas such as the Ballivor Bog Group.

Local

- Westmeath County Development Plan 2021 - 2027 acknowledges that considerable potential exists to use cutover bogs as a resource to mitigate against the impacts of climate change (e.g. rehabilitation) in addition to socio-economic benefits relating to green industries and technologies. There is clear policy support for the sustainable management of peatlands in order to protect the county's natural heritage, archaeological and non-renewable resources and contribute to Ireland's climate action strategy through appropriate future uses (including renewable energy infrastructure). The significance given to peatlands and their role within the

preservation of biodiversity and ecosystem services is in line with Bord na Móna's own understanding and vision for Ballivor Bog Group and supports the regularisation of the planning status of the Application Site in conjunction with the rehabilitation measures.

- Meath County Development Plan 2021 – 2027 establishes the connection between the sustainable management of peatlands and climate action benefits including biodiversity support and ecosystem services. Noting that the environmental and heritage resources of the County are important resources for the County, the Plan requires 'Green Infrastructure', including peatlands, to be strategically planned and managed in order to provide essential services to society. In this regard the Council, states that some cutover peatlands have the potential to facilitate various complimentary activities such the generation of renewable energy, diverse ecosystems and places of public amenity. The regularisation of the planning status of the peat extraction and associated activities undertaken at the Application Site is the first step in ensuring the sustainable use and management of the Application Site, and therefore, in line with the Plan's objectives.

- The historic development plans that could be sourced for County Meath outline a clear trend in terms of the importance of Ballivor bog as a hub for industrial employment in the county. This importance was highlighted specially in MCC CDP 1994 which outlined that industries such as peat extraction were vital for minimising unemployment as a result of increased mechanisation in agriculture. The identification of future uses for bogs such as tourism and wind energy infrastructure is also stated in these historic documents which further emphasised the desire to retain and grow employment in these areas of economic importance. The clear step-change in policy comes in the Westmeath County Development Plan 2008–2014 which shifts the local policy focus to the next era for peatlands.

2.4 Planning History of Surrounding Environs

This section describes for the purposes of the rEIAR, the relevant planning history of the lands surrounding the Application Site.

2.4.1 Peat Extraction Phase (1988 – 2020)

The majority of planning applications granted permission by the relevant planning authorities during the Peat Extraction Phase mainly relate to one-off rural dwelling houses, residential development (i.e. modification and/or re-development of existing dwellings) and agricultural development, including new entrances, sheds and ancillary plant and infrastructure. Lands immediately adjacent to, or within near proximity of, Delvin, Raharney and Ballivor settlements and the public road network (e.g. R156, L5513, L1509, L1504, L5507, L8012 and others) have experienced a higher and sustained concentration of development compared to more rural locations along the perimeter of the Application Site. It should be emphasised that the commencement of the peat extraction works and all associated activities within the Application Site generally pre-dates the current built environment, and consequently, potential impacts (e.g. traffic movements) arising from the activities associated with the Peat Extraction Phase would have been considered by the planning authorities in their assessment of said applications.

2.4.2 Current Phase (2020 – Present Day)

IPC Licence

Further to the above, it is also important to note that, from April 2000, peat extraction works were subject to the conditions of Bord na Móna's IPC Licence (Ref. P0501-01) from the EPA. The licence conditions, relating to operation and monitoring, emissions to water and air, water protection, waste management and bog rehabilitation, are intended for the protection, and where possible, the improvement of the environment and apply from the time of grant of the licence. Having regard to

Bord na Móna's historic compliance with its IPC Licence and the confined nature of the Project works to the footprint of the Application Site it is unlikely that activities within the Ballivor Bog Group development footprint would have impacted on sensitive receptors, people, watercourses and designated sites. With regard to those applications lodged post-June 2020 (as per below), industrial scale peat extraction within the Ballivor Bog Group was already permanently ceased and peat production (using existing stock) is passively operating without any discernible effects on the construction of these developments (where relevant).

Bracklyn Wind Farm

The consented Bracklyn Wind Farm (PL25M.311565), comprising 9 no. wind turbines with an overall tip height of 185m is located immediately south of Lisclogher West Bog and immediately north and west of Bracklin Bog. By virtue of its proximity to the Application Site, the Bracklyn Wind Farm has been considered within this rEIAR (and accompanying rNIS) where relevant.

Other Developments

Other infrastructural developments, including but not limited to the below, have been assessed on a pre-cautionary basis and considered, where deemed appropriate, within the supporting environmental cumulative assessments.

- N51 Higginstown to Earlsmeadow pavement works (5km from Application Site)
- N51 Dunmoe Phase 2 Realignment Scheme (c. 26 km from Application Site)

In the years since development commenced, small scale forestry in the form of conifer plantations as well as private turbary and agricultural development has continued in the vicinity immediately surrounding the Application Site.

It is also noted that there is no potential for cumulative effects between the Application Site and other bogs within the IPC licence areas due to the physical/geographical separation between the Ballivor Bog Group bogs and the other bogs in that licenced area.

In conclusion, the subject peat extraction activities and all ancillary works completed within the Application Site have been long term in duration and historic in nature and were commenced and carried out to increase national self-sufficiency in energy generation while also being an economic driver for the region. In general, the peat extraction works and associated activities are considered benign in relation to other developments, projects and consents that have been carried out and/or proposed/permitted in the interim as any significant projects over the last decades were decided in the context of the peat extraction works being in place.

Accordingly, the peat extraction activities and all ancillary works have negligible cumulative impacts in the context of historic development and the development and land-uses which followed its commencement works (1940s) and cessation (2020). Bord na Móna's continued compliance with its IPC Licence (Ref. P0501-01) has ensured that peat extraction activities and all ancillary works minimised impacts to the environment as well as proximate sensitive receptors. On-going activities within the Application Site, including the removal of existing stockpiles and the continued discharge of IPC Licence (Ref. P0501-01) conditions, are operating without any discernible effects on the construction and use of developments consented post-June 2020.

2.5 Cumulative Impact Assessment

The EIA Directive and associated guidance documents state that, as well as considering any indirect, secondary, transboundary, short-, medium-, and long-term, permanent and temporary, positive and negative effects of the project (all of which are considered in the various chapters of this rEIAR), the description of likely significant effects should include an assessment of cumulative impacts that may

arise. The factors to be considered in relation to cumulative effects include population and human health, biodiversity, land, soil, water, air, climate, material assets, landscape and cultural heritage as well as the interactions between these factors.

2.5.1 Methodology for the Cumulative Assessment of Projects

To gather a comprehensive view of cumulative impacts on the above environmental considerations and to inform the rEIA process being undertaken by the consenting authority (An Bord Pleanála), each relevant chapter within the rEIAR addresses the potential for cumulative effects to arise, where appropriate.

A cumulative impact assessment of the peat extraction activities and all ancillary works and other relevant development was undertaken with the purpose of identifying what influence the Project has had, or potentially could have, on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed and constructed projects and other land-uses in the vicinity of the Application Site. Cumulative impacts are defined as '*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*[22]'.

The Cumulative Impact Assessments (CIA) of projects has four principle aims:

1. To establish the range and nature of existing projects within the cumulative impact study area.
2. To summarise the relevant projects which have a potential to create cumulative impacts.
3. To establish anticipated cumulative impact findings from expert opinions within each relevant field. Detailed cumulative impact assessments are included in each relevant section of the rEIAR.
4. To identify the projects that hold the potential for cumulative interaction within the context of the proposed development and discard projects that will neither directly or indirectly contribute to cumulative impacts.

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the Application Site with reference to Guidance contained in Section 3.7 of the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022) and Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (EC, 1999). The material was gathered through a search of relevant online Planning Registers (e.g. Westmeath and Meath County Council's and ABP's online planning portals), reviews of relevant EIAR documents, planning application details and planning drawings in order to identify past and future projects, their activities and their environmental impacts.

The cumulative assessment study area was informed by study areas relevant to each environmental discipline, with the Boyne River Catchment (*Chapter 8 – Hydrology and Hydrogeology*) being the largest.

2.5.2 Projects Considered in Cumulative Assessment

The projects considered in relation to the potential for cumulative impacts, and for which all relevant data was reviewed, include those listed in *Sections 2.1.1 Site Planning History* and *2.1.5 Ballivor Bog Group Future Uses.* The review of the Westmeath and Meath County Council planning registers, along with ABP's online planning portal documented relevant planning applications in the vicinity of the Application Site.

[22] *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, European Commission, 1999*

A search was conducted using data from Meath and Westmeath County Councils and An Bord Pleanála's planning portals to search for all granted planning applications within c. 1km of the Application Site boundary. Applications considered within this boundary include all extant permissions between 1988 (commencement of peat extraction) to 2024 available on the various online portals mentioned above. This distance was chosen as it is considered that cumulative impacts would not exist with any applications made greater than 1km from the Application Site boundary.

Another search was also carried out to identify extant permissions for large scale infrastructure made since 2014 (to account for 10-year permissions) in order to identify projects with the potential for cumulative impacts with the current and future uses at the Application Site. This search was carried out using a 5km buffer from the Application Site. The types of relevant developments considered within this study area include those associated with:

- Quarrying,
- Industrial developments,
- Agriculture,
- Forestry,
- Renewable energy (including the proposed Ballivor Wind Farm and permitted Bracklyn Wind Farm),
- Peat extraction.

These planning applications have also been taken into account when describing the baseline environment and within the relevant environmental assessments comprising this rEIAR, where appropriate.

All relevant potential cumulative effects have been considered, where necessary, in the following Chapters of this rEIAR.

2.6 Scoping and Consultation

2.6.1 Scoping

Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to a remedial Environmental Impact Assessment (rEIA). This process is conducted by contacting the relevant authorities and Non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment with the potential to be affected by the Project. These organisations are invited to submit comments on the scope of the rEIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the rEIAR refers to all relevant aspects of the Project and its potential effects on the environment and provides initial feedback in the early stages of the project, when alterations are still easily incorporated into the design. In this way, scoping both informs the content and scope of the rEIAR and provides a feedback mechanism for the proposal design itself.

A scoping report, providing details of the Application Site and the Project, was prepared by MKO and circulated in November 2021. MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process. Following the recent updates made to legislation on governing Substitute Consent as noted in Section 2.2.5, a request for comments on the scoping report was recirculated in February 2024. The scoping responses from relevant personnel/bodies in their respective capacities as consultees are listed below and the relevant responses included as Appendix 2-1 of this rEIAR.

2.6.2 Scoping Responses

Table 2-4 presents a summary of all scoping responses received. Copies of the scoping responses are included in Appendix 2-1 of this rEIAR. The recommendations of the consultees have informed the rEIAR preparation process and the contents of the same.

Table -2-5. Scoping Responses

No.	Consultee	Date of Response	Response
1	An Taisce	None to date	None to date
2	Bat Conservation Ireland	None to date	None to date
3	Bird Watch Ireland	None to date	None to date
4	Butterfly Conservation Ireland (BCI)	None to date	None to date
5	Commission for Regulation of Utilities	None to date	None to date
6	Department of Agriculture, Food and the Marine (including forestry)	07/01/2022, 14/03,2024	**07/01/2022** No observations to make at the time of response. **14/03/2024** Response received relating to felling licence - see observations attached from their Felling Division.
7	Department of Culture, Heritage and the Gaeltacht	14/02/2022	Response received from Development Applications Unit under the following headings: › Nature Conservation; ○ Ensure no impacts on Designated Sites ○ Cumulatively assess third party turf cutting › Matters relating to the rEIAR ○ rEIAR should assess from Feb 1990 onwards when EIA Directive was transposed into Irish Law ○ Include spatial and temporal peat and drainage info; drainage maintenance activities, ancillary works, vegetation clearance timeframes ○ Should include offsite projects and end-users such as peat processing factory in Ballivor ○ Refer to EPA monitoring data

No.	Consultee	Date of Response	Response
			○ Refer to emissions associated with peat extraction › Matters relating to Appropriate Assessment
7	Department of the Environment, Climate and Communications	21/01/2022	Forwarded on a response from the GSI which was a generalised response recommending we use the GSI mapviewer and forward on any geotechnical reports we produce
8	Department of Housing, Local Government and Heritage	14/01/2022, 16/02/2024	**14/01/2022** Provided heritage related observations and recommendations under the following headings: › Nature Conservation › Archaeological Impact Assessment › Matters related to the rEIAR › Matters related to Appropriate Assessment **16/02/2024** Provided further heritage related observations and recommendations
9	Department of Tourism, Culture, Arts, Gaeltacht Sport and Media	None to date	None to date
10	Transport Infrastructure Ireland	08/12/2021, 20/03/2024	**08/12/2021** Provided recommendations to be considered in the preparation of rEIAR which may affect national road network. **20/03/2024** Provided updated recommendations to be considered in the preparation of the rEIAR which may affect national road network.
11	Department of Transport	16/12/2021, 29/02/2024	**16/12/2021** No observations to make at the time of response. **29/02/2024** No observations to make at the time of response.
12	Eastern and Midland Regional Assembly	None to date	None to date
13	Environmental Protection Agency	10/12/2021, 21/01/2022, 27/03/2024	**10/12/2021**

No.	Consultee	Date of Response	Response
			Requested further comments on the scope and level of detail of the information to be included by the developer in the environmental impact assessment report within two weeks of the response. **21/01/2022** The Agency is of the opinion that the scope and level of detail to be included in the remedial environmental impact assessment report should as a minimum: (i) address the matters raised in the responses received from the bodies detailed above; (ii) have regard to the rehabilitation plan(s) required under Condition 10 of Licence Reg No. P0501 for any relevant bog areas; (iii) consideration should be given to inclusion of any relevant bog areas in an enhanced rehabilitation scheme, e.g., under the Peatlands Climate Action Scheme (PCAS). (iv) have regard to relevant water quality monitoring data. Any gaps in water quality data for receiving waters should be filled by a sampling programme over an appropriately representative period of time. **27/03/2024** Provided same Scoping Opinion as issued previously.
14	EirGrid	None to date	None to date
15	Fáilte Ireland	19/12/2021, 01/03/2024	**19/12/2021** Provided non-statutory guidance document on the Treatment of Tourism in EIA **01/03/2024** Provided same guidance document as issued previously.
16	Geological Survey of Ireland	15/12/2021, 28/02/2024	**15/12/2021** › Provided list of relevant available datasets,

No.	Consultee	Date of Response	Response
			› Recommend referring to GSI Groundwater and Geothermal Unit run GW Climate project; which is a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland. This is a follow on from a previous project (GWFlood). › Requests copy of reports detailing any site investigations carried out. **28/02/2024** Provided same list of available datasets and recommendations as issued previously.
17	Health Service Executive	22/12/2021	HSE is satisfied that the Scoping Document identifies the potential environmental effects of the project which will be addressed in the rEIAR.
18	Inland Fisheries Ireland	None to date	
19	Irish Peatland Conservation Council	None to date	None to date
20	Irish Red Grouse Association	None to date	None to date
21	Irish Raptor Study Group	None to date	None to date
22	Irish Water	20/03/2024	Provided recommendations to be considered in the preparation of rEIAR which may affect Water Services.
23	Irish Wildlife Trust	21/02/2024	No capacity to respond at the time.
24	Meath County Council - Planning Department	04/02/2022	› The scope of works proposed in the Biodiversity Section should include reference to invasive species in accordance with European Communities (Birds and Natural Habitats) Regulations 2011 – Third Schedule (Regulations 49 and 50). › Habitat Surveys should have regard to the extent of Annex I habitats on site – in particular – Annex I habitat Degraded raised bogs still capable of regeneration [code 7120]. › It is noted in section 4.2 - 'In compliance with the IPC licence P0501-01, draft Rehabilitation Plans have been produced by Bord na Móna for all Bogs in the Ballivor Bog Group It is a requirement of Condition 10 of the aforementioned IPC

No.	Consultee	Date of Response	Response
			Licence, however, that following decommissioning of use or involvement of all or part of the site in the licensed activity, Bord na Móna prepares (to the satisfaction of the EPA) and implements a final Cutaway Bog Rehabilitation Plan for the Ballivor Bog Group. › The discharge of Condition 10 will facilitate the permanent rehabilitation of the Ballivor Bog Group in conjunction with any parallel future end-uses (wind energy infrastructure)'.
25	Office of Public Works	None to date	None to date
26	Eastern River Basin District	None to date	None to date
27	Sustainable Energy Authority of Ireland	None to date	None to date
28	The Heritage Council	None to date	None to date
29	The Arts Council	None to date	None to date
31	Waterways Ireland	15/02/2024	No observations to make at the time of response.
32	Westmeath County Council - Planning Department	None to date	None to date

2.6.3 Pre-Planning Consultation

Members of the team and the prospective Applicant met with representatives from the Board on the 30th of May 2024. Those in attendance were:

- Tommy Harlin (MKO)
- Sean Creedon (MKO)
- Meabhann Crowe (MKO)
- Grainne Griffin (MKO)
- Caitriona Carter (Bord na Móna)
- Emma Cross (Bord na Móna)
- Conor McGrath (ABP)
- Susan McHugh (ABP)
- Karen Hickey (ABP)

The team gave an overview of the Proposed Project in a Power Point Presentation. Matters discussed included:

- Site Location
- Historical Background of Bord Na Móna
- Works for which Substitute Consent is being Sought
- Updates to Legislation
- Exceptional Circumstances
- Application Contents
- Administrative MattersDrainage
- Scoping
- EPA Licence
- March Fritillary
- Drawing Scales
- Number of hard/soft copies required for lodgement

3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 192014/52/EU (the EIA Directive) requires that the EIAR prepared by the developer contains *"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."*

Article 5(1)(f) of the EIA Directive requires that the EIAR contains *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

Annex IV of the EIA Directive states that the information provided in an Environmental Impact Assessment Report (EIAR) should include a *"description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

The need for the Project and the background of the Development Programmes which led to the development of peat extraction activities at the Application Site (i.e., Ballivor, Bracklin, Carranstown, Lisclogher and Lisclogher West Bogs) is discussed in Chapter 2 of this rEIAR. This chapter explores the alternatives considered and an indication of the main reason for the final choice, taking into account the environmental effects.

As set out in the '*Guidelines on The Information to be Contained in Environmental Impact Assessment Reports'* (Environmental Protection Agency, 2022), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

3.2 Methodology

The European Commission published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including '*Guidance on Screening*', '*Guidance on Scoping*' and '*Guidance on the preparation of the Environmental Impact Assessment Report*'. The EU Guidance Document (EU, 2017) on the preparation of the EIAR outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the following must be provided:

- A description of the reasonable alternatives studied; and,
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives "*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*".

The guidance also acknowledges that "*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or*

cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative".

The current Environmental Protection Agency (EPA) Guidelines (EPA, 2022) state that "*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*"

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' Option;
- Alternative Locations;
- Alternative Industries;
- Alternative Layouts;
- Alternative Processes;
- Alternative Control Measures; and,
- Alternative to the Rehabilitation Plan.

Each of these is addressed in the following sections.

3.2.1 Temporal Range

As outlined in Chapter 1, the assessment undertaken in this rEIAR covers the period 1988 (i.e the date when the EIA Directive was required to be transposed into Irish law), to present day. As such, this assessment of alternatives considers the alternatives possible at the Application Site from 1988. As discussed in Chapter 4, the Project was already well established at the Application Site in 1988, with peat extraction having commenced there some 35 years earlier in 1953, and the onset of the installation of drainage some 5 years before that, in 1948. As such, alternatives explored before 1988 are also provided for context, to illustrate how and why, by 1988, peat extraction was so extensively developed as an activity at the Application Site, and how previously explored options informed the continuation of peat extraction beyond 1988 until 2020. It is important to note that while the alternatives to the continuance of the Project after 1988 will be examined, as the Project has already taken place, these alternatives are broadly no longer possible.

3.2.2 Statement of Authority

This section of the rEIAR has been prepared by Ellen Costello and reviewed by Sean Creedon, of MKO. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen has been involved in a range of large-scale commercial projects and renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment.

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

professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

3.3 Consideration of Alternatives

3.3.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's

statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

3.3.2 Alternative Locations

The identification of suitable peat extraction sites within the Applicant's landholding began in 1935, when the then newly established Turf Development Board Ltd. began a systemic survey of all Irish bogs (as discussed in Chapter 2, the Turf Development Board Ltd. became Bord na Móna, a statutory corporation, following the commencement of the Turf Development Act, 1946). The surveys of the bogs by the Turf Development Board Ltd. built on the knowledge presented by a series of four reports published by Bog Commissioners between 1810 and 1814, which examined the major bogs of Ireland specifically in relation to their suitability for use in agriculture and provided an excellent starting point for the surveys of bogs suitable for peat extraction. From 1935 to 1937, some 13 initial surveys were carried out and over the next 17 years some 625 separate surveys were done to build an expansive knowledge of the Applicant's landholding and allow informed decisions to be made with regards the selection of sites for peat extraction (Clarke, 2010).

The strategic location of the Application Site centrally in the country, its proximity to other Bord na Móna sites and factories, and the existence of several local roads through the Application Site led to the Application Site being selected for systematic and state-lead peat extraction under the Second Development Programme in the 1940s. By 1988, the Application Site was benefitting from existing onsite infrastructure such as the interconnectivity of the bogs via a rail network, several peat processing buildings, trained staff, and proximity to other Bord na Móna assets.

By 1988, the Application Site was well-established as a large, industrial-scale peat extraction site owned and operated by Bord na Móna. By this time, drainage was installed extensively across the Application Site and peat extraction was well established and ongoing. The site already benefitted from onsite infrastructure including railway lines, storage, and workshop facilities, had implemented drainage throughout (except at Lisclogher West bog), and employed trained permanent and seasonal staff which were situated locally to the bogs. The existing operations and activities established at the Application Site in 1988 supported the sensical continuance and further expansion of peat extraction activities there, namely in the opening up of the eastern part of Carranstown and the northern portion of Bracklin West, drainage insertion into Lisclogher-West, and the development of additional supporting buildings. These additional buildings were located at the Ballivor Works due to existing complimentary infrastructure and established site entrances there off the regional R156 road. As outlined in Chapter 2, these developments include:

- Establishment of a tea centre in 1988 (Planning Reference 8841, granted by Westmeath Co. Co),
- Extension to storage facilities in 1990 (Planning Reference 90554, granted by Westmeath Co. Co),
- Construction of a 10/20kV ESB substation in 2005 (Planning Reference 052348, granted by Westmeath Co. Co).

Given that peat extraction activities and all ancillary works at the Application Site were well established in 1988, choosing an alternative site for peat extraction at that point in time was not a sensical option for

Bord na Móna from an operations or environmental perspective, as all sites which had been identified as suitable for peat extraction through extensive surveys within Bord na Móna's land holding were subject to peat extraction. Further, to relocate peat extraction activities from the Application Site to a site which had not been subject to the insertion of drainage and peat extraction would have likely incurred more significant environmental impacts than continuing peat extraction activities at the Application Site post-1988. Continuing peat extraction at the Application Site, which already benefitted from site clearance, drainage, infrastructure and trained staff, was economical and necessary to meet the national energy demand.

3.3.3 Alternative Industries

The nature and makeup of landcover at the Application Site is fundamental to its selection and use in the peat extraction industry. In 1988, there was no existing alternative industry type established on a site such as a cutaway or cutover bog. As mentioned, by 1988, the Application Site had benefited from existing onsite infrastructure such as the interconnectivity of the bogs via a rail network, several peat processing buildings, trained staff, and proximity to other Bord na Móna assets. Therefore, continuing with the peat extraction industry was an economically viable decision.

As discussed in Section 3.3.2, the Bog Commissioners published between 1810 and 1814 a series of four reports which set out, in detail, how 1,013,358 acres of bog could be drained, manured and brought into production as agricultural land. The reports were gradually published from 1810 to 1814 and each report contains detailed maps which set out the proposed lines of drainage and the highest and lowest point of each bog. Due to various reasons, including the fact that the British Government was short of money after the Napoleonic Wars, the proposals in the Bog Commissioner's reports were not acted upon.

Nonetheless, over the years, various initiatives were trialled to continually assess if alternative activities could be established on cutover and cutaway bogs. These initiatives included the use of bogs for forestry, agricultural production, and horticulture. In order to best inform the establishment of these alternative industries, two series of surveys were carried out on Bord na Móna peatland soils between 1963 and 1969 with the aim of establishing detailed knowledge on the types of peat in, and the subsoils underneath, every peatland area. The first survey, conducted by An Foras Talúntais[1] ('AFT') was of the mineral soils underneath the peat; the second was of the types of peat in peatlands that had been drained on average for 20 years and on which production had taken place. These surveys informed the siting of potential alternative industries, the trials of which are examined below.

3.3.3.1 Forestry

Afforestation trials on small areas of peatland in Lyrecrumpane, Co. Kerry began in the 1940s. By the early 1950s, discussions between Bord na Móna and the Department of Lands were underway about the possibility of planting trees at Clonsast, and in 1954 it was agreed by Bord na Móna to lease 15 acres of Clonsast to the Department of Lands for the experimental forestry trials. These trials commenced in 1955. Additionally, Bord na Móna agreed to lease a further 55 acres of bog at Lullymore to the Department of Lands to facilitate further forestry trials. In 1960, these land leases at Lullymore were transferred to AFT. By the early 1960s, the Lyrecrumpane forestry plantation had been sold to the Forestry Division of the Department of Lands.

Between 1976 and 1978, AFT undertook research on the growing of short-rotation forestry on cutaway peatlands for biomass. Subsequently in 1978, Bord na Móna agreed to participate in a biomass energy research and development program, devised by the National Board for Science and Technology (NBST) and funded by the European Economic Community. This program was focused on the conversion of biomass to energy, and in 1979, 120 hectares of short-rotation forestry was planted in

[1] *AFT was established with the* Agriculture (An Foras Talúntais) Act, 1958. *The chief function of AFT was 'to review, facilitate, encourage, assist, co-ordinate, promote and undertake agricultural research'.*

Clonsast and Boora in Co. Offaly. However, the results of these plantings were poor, with yields of dry matter significantly below those which would be required to be economically viable. A similar endeavour of planting 100 hectares of coniferous forestry on blanket bog in Oweninny, Co. Mayo, yielded similar results, and ultimately the project was terminated in 1984.

In 1987, the Government decided that any suitable cutaway bog areas which were deemed suitable for afforestation would be transferred by lease to the Forestry Service. The subsequent planting of these areas by Coillte demonstrated the issues associated with developing viable commercial forestry industry on cutaway areas. These issues included varying peat depths, local microclimates, and susceptibility to late frosts.

In 1998, a joint venture research project between Bord na Móna, Coillte, and the Forest Service, and coordinated by UCD was launched. The objective of the BOGFOR project was to investigate the forestry potential of cutaway bogs and develop techniques for establishing successful forests. This research concluded that while there is potential for the use of cutaway peatlands in establishing successful forestry plantations, any such endeavour would require careful site selection and tailored management techniques to mitigate the inherent difficulties associated with cutaway peatlands as a medium for forestry, including heterogeneity of peat depths, peat types, and sub-peat mineral soil (Renou-Wilson, 2008). At present, Coillte continue to manage some areas of Bord na Móna peatlands via leasehold.

3.3.3.2 Agriculture

As outlined in Section 3.3.3 above, the very initial possible use explored for Bord na Móna boglands was agricultural production. Throughout the decades, various agricultural trials were conducted on Bord na Móna cutaway lands to determine the viability of agricultural production as an alternative industry to the continuation of peat extraction.

Early AFT research indicated that grass was the most successful crop on cutaway bog (Healy, 1980). From 1962, research focused primarily on grassland and its use for beef production. In 1969, Bord na Móna agreed to provide funding to the AFT to fund research into grass growing on sod peat cutaway at Timahoe, Co. Kildare. In 1971, Bord na Móna provided further funding to AFT to stock cattle on grassland which had been sown on cutaway bog in Lullymore, Co. Kildare. Bord na Móna also began rearing cattle at Clonsast and Derrygreenagh in 1972. While grass yields were acceptable, dietary mineral supplementation was required owing to deficiencies present in the grasslands. In Oweninny, Co. Mayo, a separate sheep-rearing project was undertaken in the early 1970s on grassland that had been developed on cutaway bog, where a flock of 1,000 sheep was established. By 1979, the disparity between the performance of grass on shallow versus deep peat resulted in the deeper peat areas been taken out of grassland production. Due to animal production problems and issues with grass growth, the project was a complete financial loss, and was eventually ended in 1983.

In addition to livestock, Bord na Móna also examined the option of growing vegetables and other crops on their lands. Commencing in 1967, AFT began trials of bamboo on Bord na Móna lands. AFT also commenced trials of a multitude of cereal crops and other vegetables, including onions, French beans, peas, flax, rapeseed, mustard and poppies, all of which proved unsuccessful. There was limited success with trials of beet and potato crops in areas of deep peat.

Ultimately, experiments undertaken in respect of agricultural production across the Bord na Móna landbank have determined that product yields are significantly less than those required to maintain financial viability. As such, the continuation of peat extraction activities from 1988 onwards on lands which were already developed for that purpose was the only viable option.

3.3.3.3 Horticulture

In 1966, Bord na Móna established a shrub nursery at Lullymore for the growing of ornamental shrubs and trees on cutaway peatland. The intent was to establish a major industry which involved the growing and export of mostly ericaceous shrubs. In 1970, the board of Bord na Móna expanded the area shrub nursery and purchased a substantial quantity of shrubs. However, by 1982, the then soon-to-be appointed managing director of Bord na Móna, Paddy MacEvilly, instructed that the shrub nursery be closed, though in 1983, it was agreed that the facility remain open for another year. The project was ultimately economically unviable and did not provide the financial returns needed to justify its operation. Ultimately, the Lullymore shrub nursery was sold in 1988.

3.3.3.4 Renewable Energy

The first large-scale development or industry to be located on a cutover peat site was the Bord na Móna Bellacorick Wind Farm which was commissioned on Oweninny bog in Co. Mayo in 1992. This was followed by the adjacent Oweninny Wind Farm (Phase 1), a joint venture with ESB Networks, which was commissioned in 2019. Bord na Móna have since developed numerous renewable energy developments, including Mountlucas Wind Farm, Bruckana Wind Farm, Cloncreen Wind Farm, Oweninny Wind Farm (Phase 2), Derrinlough Wind Farm, and Timahoe North Solar Farm. These developments will play an invaluable role in decarbonising electricity production nationally, while providing additional benefits such as employment and the provision of public amenity in the form of walkways and other installations. Local communities also benefit from additional rates paid to the Local Authority which support the provision of local services, community benefit schemes, upgrading of road infrastructure in the vicinity of the developments as required, payment of taxes from the developments, and dividends from Bord na Móna to the State, and indirect employment created through the sub-supply of a wide range of products and services.

Additionally, the permanent footprint of these renewable energy projects is small relative to the extent of the lands on which they are sited, leaving large tracts of lands available for peatland rehabilitation and enhancement. The experience at Bord na Móna's existing wind energy developments has clearly demonstrated that peatland rehabilitation and wind farm development can co-exist successfully. The opportunity to build renewable energy infrastructure on land that can also develop as a carbon sink and enhance wildlife habitats presents a unique opportunity to meet Ireland climate change and biodiversity enhancement commitments.

It has generally been accepted by policy makers at national, regional and local level that the cutaway bogs present potentially ideal locations for renewable energy infrastructure.

Of each of the alternative industries examined by Bord na Móna in devising plans for peatlands exclusive of peat extraction, renewable energy is the chosen option. The benefits, which include decarbonisation of electricity, employment opportunities, community benefits, and providing for significant rehabilitation and enhancement opportunities of peatlands make renewable energy the logical alternative option to peat extraction.

Bord na Móna recognises the Application Site as an important natural asset which has the potential to play a strategic role in meeting national climate action targets. Intact or functioning peatlands are natural carbon sinks which can play a considerable role in mitigating against the impacts of climate change. Bord na Móna has transitioned from peat production to renewable energy, sustainable waste management, carbon storage and biodiversity conservation.

The implementation of key elements of the 'Brown-to-Green' Strategy between 2018 – 2020 resulted in both significant changes and progress in re-focusing and strengthening Bord na Móna's operations to renewable energy generation, recycling and the development of other low carbon enterprises. Bord na Móna's formal announcement in January 2021 that all industrial scale peat extraction on lands within its

management would permanently cease represents a historic milestone in the implementation of the 'Brown-to-Green' strategy.

Bord na Móna continues to progress its 'Brown-to-Green' Strategy on the basis of 4 no. core strategic actions):

i. *Provide Ireland with sustainable energy from renewable sources at scale;*
ii. *Effectively rehabilitate our peatlands;*
iii. *Deliver world-class waste and resource recovery solutions; and,*
iv. *Help Ireland reimagine how it engages with climate action*

In line with Ireland's carbon reduction ambitions Bord na Móna intend to utilise the Ballivor Bog Group for both wind energy infrastructure[2] and rehabilitation measures[3] to facilitate environmental stabilisation of the bog group and the optimisation of climate action benefits. The reduction of emissions is a key proponent of the enacted Climate Action and Low Carbon Development (Amendment) Act 2021, which aims to achieve a climate neutral economy by no later than 2050. The establishment of low carbon economies through increased renewable energy generation, e.g., wind, has therefore become a time-critical consideration underpinning the current development of the country.

Another alternative for the Application Site would be a proposed solar farm development which would also align with the 4 no. core strategic actions of the Brown to Green Strategy. However, to develop a solar farm at this Application Site with a similar renewable energy output, a solar farm of considerable scale would be required including the development of Lisclogher West, which is not included in the design of the proposed Ballivor Wind Farm.

Therefore, Bord na Móna's preferred option for future development at the Application Site is the implementation of wind energy infrastructure which is both compatible with climate change policy and targets and Bord na Móna's Brown to Green Strategy. The proposed Ballivor Wind Farm (PA 25M.316212) is also considered compatible with Bord na Móna's Cutaway Bog Decommissioning and Rehabilitation Plans which will be implemented in agreement with the EPA as per Condition 10 of the IPC Licence. As part of any future wind farm development application, the compatibility of the proposed wind farm with peatland rehabilitation will undergo full environmental impact assessment.

3.3.4 Alternative Layouts

Peat extraction activities and ancillary works have been ongoing at the Application Site since 1948. In the context of peat extraction, it is considered that drainage infrastructure is the defining element of the Application Site layout. The drainage layout at any given time between 1948 and the cessation of peat extraction in 2020 was considered the most optimum layout at the time with respect to local conditions. The drainage layout was altered from time to time depending on a change in local conditions but has broadly remained the same. Drainage designs, as described in Chapter 4, have remained unchanged since their initial installation on the Application Site in 1948, though the number of drains and orientation of same may have changed as required in response to local conditions and as operations expanded across the Application Site through the decades. It is considered that the site layout was at all times the optimum layout to facilitate the Project on site. The layout at any given time would have ensured optimal resource utilisation (as an example, the location of temporary rail lines would change as required to minimise fuel usage and time expended transporting extracted peat from the Application Site to Ballivor Works).

[2] *An application for the Proposed Ballivor Wind Farm was submitted to An Bord Pleanála in April 2023 under Section 37B of the Planning and Development Act 2000 (as amended) (ABP Ref. PA25M.316212), and is currently waiting decision.*
[3] *As per Condition 10 (Cutaway Bog Rehabilitation) of the Applicant's IPC Licence (Ref. P0501-01)*

3.3.5 Alternative Processes

As outlined in Chapter 4, the methods associated with peat extraction have been well-developed over time, since the onset of peat extraction activities on Bord na Móna lands in the 1940s. Throughout the decades, these processes have been continually improved, utilising the most up-to-date techniques and machinery to make the process as efficient as possible. The organisation of Bord na Móna bogs into bog groups allowed local oversight into development, ensuring that locally encountered conditions could be worked in the most efficient manner possible. The processes used at any given time were based on extensive observation, research and development to inform the most optimum solutions available; in this regard, the highly-skilled staff who worked at the Application Site were a significant asset to the Project, as their site-specific knowledge and understanding of the bogs they worked was instrumental in informing which machines were most suitable for the processes being undertaken, and whether any modifications to machines, which could be made locally at Ballivor Works, could enhance the efficiency of the processes of the Project. Throughout the decades, machinery was kept up to date with the best available technology to ensure that the Project was operating with maximum efficiency, while satisfying required safety standards and also enhancing environmental performance (e.g. as more modern and powerful tractor engines were developed and utilised on site, the number of tractors required to undertake peat extraction activities would have lessened, thereby reducing fuel consumption and emissions from same).

3.3.6 Alternative Control Measures

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

Additionally, after the discovery and subsequent preservation of trackways at Corlea Bog, Co. Longford by Bord na Móna employees in the 1980s, a new programme for peatland archaeology was established. Since 1991 an annual programme of archaeological survey, initially funded by the National Monuments Service, has been conducted in Bord na Móna Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record.

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

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

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

Móna was established in 2012.[4] This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable Bord na Móna to progress with peat extraction activities and all ancillary works and simultaneously ensure archaeological control measures are in place.

As described in Chapter 4, from April 2000, IPC Licence P0501-01 was implemented across the Application Site. The IPC Licence is subject to 14. No conditions pertaining to the ongoing monitoring and maintenance to ensure any emissions from site activities will comply with and not contravene, any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992. In the intervening period since the grant of the IPC Licence, Bord na Móna has implemented the mitigation and monitoring measures as listed in the Licence. Bord na Móna intend to continue implementing and practising the mitigation and monitoring measures as listed in the Licence after the Application Site is decommissioned, where applicable.

As outlined above, Bord na Móna have, of their own volition, implemented control measures across the Application Site to reduce environmental impact and have proactively engaged with the relevant specialist stakeholders to ensure that control measures are proportionate and correctly applied and monitored. It is considered that these control measures were the optimum possible control measures with respect to Project activities at the Application Site between 1988 and present day.

3.3.7 Alternative to Rehabilitation Plan

It is a statutory obligation of Bord na Móna under Condition 10 of the EPA Licence to rehabilitate peatlands of the Application Site once the site is fully decommissioned. Cutaway Bog Decommissioning and Rehabilitation Plans have been produced for each of the bog units of the Application Site. Please see Appendix 4-2 for the Cutaway Bog Decommissioning and Rehabilitation Plans and Appendix 4-1 for the EPA licence decommissioning requirements. An alternative option would be to not implement any rehabilitation plan of the Application Site. The rehabilitation of the Application Site will be implemented irrespective of this application and in line with the requirements of the EPA. The discharge of Condition 10 will facilitate the permanent rehabilitation of the Ballivor Bog Group in conjunction with any parallel future end-uses (such as proposed wind energy infrastructure) and have been cumulatively assessed with the future wind energy development in the following chapters. Accordingly, and as outlined in the Cutaway Bog Decommissioning and Rehabilitation Plans, it is anticipated that significant effects on the environment can be remediated.

3.4 Conclusion

The location, nature, landcover and scale of the Application Site determined its selection by Bord na Móna, under powers vested by the Turf Development Act, 1946, as a strategic and important national asset to generate considerable fuel sources for the State. Alternative industries or uses were not possible at the Application Site in 1988 and alternative locations could only be other large scale peat sites which were acquired by the State and also underwent large-scale peat extraction. Thus, alternative locations or industries are not considered a reasonable alternative. Similarly, as peat extraction was already ongoing in 1988 and continued until June 2020, a 'Do-Nothing option is not credible as the Project has already occurred. Building on the success of operations from 1948 to 1988, the further expansion of peat extraction activities and all ancillary works was undertaken from 1988 at the Application Site in the form of opening up additional areas for extraction at eastern Carranstown and a portion of western Bracklin, as well as the insertion of drainage into Lisclogher West (though Lisclogher West was never subject to peat extraction).

[4] *2012 Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Mónahttps://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf*

With the implementation of Bord na Móna's Brown-to-Green' Strategy and the permanent cessation of peat extraction at the Application Site in June 2020, the Applicant recognises the opportunity to transform the site into a sustainable, clean, and renewable energy source while simultaneously facilitating peatland rehabilitation at the site and providing opportunities for amenity, tourism and employment. Thus, the selected future proposal for the Application Site includes a proposed wind energy development which can maximise the Application Site's renewable energy potential without significant environmental impact and can coincide harmoniously with peatland rehabilitation plans which are statutory obligation of Bord na Móna under Condition 10 of the IPC Licence. The compatibility of both rehabilitation works associated with Condition 10 of the IPC Licence, and the proposed Ballivor Wind Farm is cumulatively assessed in this rEIAR. The proposed Ballivor Wind Farm was subject to a standalone Environmental Impact Assessment Report and which also took the peatland rehabilitation plans into consideration.

4. DESCRIPTION OF THE DEVELOPMENT

4.1 Introduction

This chapter of the rEIAR provides a description of the activities at the Application Site from 1948 at the onset of site preparation up to July 1988, a description of the baseline as of July 1988, a description of activities from 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future. The elements of the Project as described in this chapter are the baseline as of July 1988, the activities from July 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020, and the activities relating to historic peat extraction intended to be carried out into the future. As described in Chapter 1, July 1988 is taken as the baseline assessment year for this rEIAR as this is the latest date that the EIA Directive (Council Directive 85/337/EEC) was required to be transposed into Irish legislation. This approach has been taken on a precautionary basis and strictly without prejudice, as EIA may not have been a legal requirement at that time. The assessment period for the rEIAR is from July 1988 to the present day.

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

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

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

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

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

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

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

The historic activities described below include: the peat extraction processes, the construction, operation, and maintenance of supporting infrastructure and a description of ancillary activities undertaken. It also describes the current onsite activities and infrastructure as well as the proposed future remedial measures which will be implemented at the site in the form of decommissioning and peatland rehabilitation plans, subject to the agreement of the Environmental Protection Agency (EPA), and as required under Condition 10 of its Integrated Pollution Control (IPC) Licence P0501-01. Please see Appendix 4-1 for a copy of the licence.

The peat extraction activities and all ancillary works are historic, with a considerable number of activities and site preparation works pre-dating both the commencement of the formal Irish planning system (i.e., were first carried out prior to the establishment of the *Planning & Development Act 1963* (which was enacted on 1st October 1964) as well as both the EIA and Habitats Directive transposition dates in 1988 and 1994 respectively. Other infrastructure such as workshops, storage and loading facilities were also developed prior to the commencement of the formal planning system, while other ancillary services and infrastructure such as electricity distribution infrastructure, workshops, peat storage and loading facilities are located outside of the Application Site boundary and were previously granted their own respective planning consents (where required). This infrastructure is included below and considered within the overall rEIAR assessment.

4.1.1 Statement of Authority

This section of the rEIAR has been prepared by Ellen Costello and reviewed by Sean Creedon, of MKO. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Prior to joining MKO Sean fulfilled several project and program management roles within Bord na Mona. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

4.1.2 Project Description Information Sources

- Integrated Pollution Control Licence (IPC) Licence Derrygreenagh Bog Group (Ref. P0501-01) Environmental Protection Agency (included in Appendix 4-1);
- Bord na Móna Cutaway Bog and Decommissioning and Rehabilitation Plans, (included in Appendix 4-2):
    - Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan;

  - Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan;
    Bracklin West Bog 2023 Cutaway Bog Decommissioning and Rehabilitation Plan;
  - Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan;
  - Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan; and,
  - Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan.
- Bord na Móna Annual Reports which contain information relevant to the Application Site;
- Bord na Móna Living History website[1];
- Brown Gold, A History of Bord na Móna and the peat industry in Ireland, Clarke, Donal 2010;
- IPC Licence, Annual Environmental Reports 2000-2023 (included in Appendix 4-3 (2018 to 2023 are also publicly available[2]));
- Inspection of production records at Ballivor Works;
- IPC Licence P0501-01 Application 1999 (Available at EPA Headquarters on request);
- Aerial Maps from 1973 to 2020 (included in Appendix 4-4);
- Bord na Móna IPC training programme (included in Appendix 4-5);
- Personal communications with former Bord na Móna Employees;
- Silt Committee Interim Report Recommended Measures 1976 (included in Appendix 4-6);
- Silt Committee Excavator records 1984 (included in Appendix 4-7);
- Silt Committee Meeting Records Derrygreenagh 1984 (included in Appendix 4-8);
- Silt Control Report for Peat Energy Division Jim Harkins Bord na Móna Report 1991 (included in Appendix 4-9);
- Bord na Móna Peat Development In Ireland 1954 (included in Appendix 4-10);
- Bord na Móna Environmental & Operational Procedures for the Protection of Surface Water (included in Appendix 4-11);
- Planning Drawing Pack (included in Appendix 4-12);
- Irish Engineers Journal Supplement 1970 (p.13-15);
- Bord na Móna Biodiversity Action Plan 2016-2021 (included in Appendix 4-13);
- Silt Control Study– Internal Bord na Móna Report 1984 (included in Appendix 4-14);
- Drainage Study with Particular Reference to Pumping – Internal Bord na Móna Report 1984 (included in Appendix 4-15);
- Peco Harvester Tests – Internal Bord na Móna Report 1986 (included in Appendix 4-16);
- Distribution and Nature of Mineral 'Ash' Material in a Milled Peat Stockpile – Internal Bord na Móna (included in Appendix 4-17);
- Regional Administration in Relation to Milled Peat Operation – Internal Bord na Móna Report 1988 (included in Appendix 4-18); and,
- Industrial Cutaway Bog Land-Use Studies (Clonsast) – Internal Bord na Móna Report 1978 (included in Appendix 4-19).

[1] *Available at:* https://www.bordnamonalivinghistory.ie/

[2] *Annual Environmental Reports 2018-2023 available at:* https://leap.epa.ie/licence-profile/P0501/compliance

4.1.3 Information Required for the Description of the Project

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

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

1) Description of the project, including in particular:		Relevance to application	Location In rEIAR
a)	*a description of the location of the project;*	Ballivor Bog, Carranstown Bog, Bracklin Bog, Lisclogher Bog and Lisclogher West Bog, part of the Ballivor Bog Group, which is a subset of the Derrygreenagh Bog Group. The Ballivor Bog Group is located on the border of Co. Westmeath and Meath	Chapter 1 Introduction Chapter 4 Description
b)	*a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*	Site baseline description (as of July 1988), site preparation works pre-commencement of industrial peat extraction, drainage implementation, supporting infrastructure	Chapter 4 Description Chapters 5 to 15
c)	*a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*	Peat extraction activities and all ancillary works from July 1988 – June 2020, including peat volumes extracted, peat extraction methods, machinery requirements, scale of operational areas required peat extraction methods, supporting activities Vegetation clearance, habitat removal, peat volumes extracted, energy used	Chapter 4 Description Chapter 6 Biodiversity Chapter 7 – Land, Soils and Geology Chapter 8 – Hydrology and Hydrogeology Chapter 9 Air Quality Chapter 10 Climate Chapter 14 Material Assets Appendix 4-3 Annual Environment Reports

	1) Description of the project, including in particular:	Relevance to application	Location In rEIAR
d)	*an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.*	Silt run off, waste management, noise and vibration emissions, dust and CO_2 emissions	Chapter 4 Description Chapter 7 Land Soil and Geology Chapter 8 Hydrology and Hydrogeology Chapter 9 Air Quality Chapter 10 Climate Chapter 11 Noise and Vibration Chapter 14 Material Assets Appendix 4-3 Annual Environment Reports

4.2 Project Description

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

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

i. *Installation of surface water drainage infrastructure at Ballivor Bog Group, specifically at Ballivor, Carranstown, Bracklin, Lisclogher, and Lisclogher West Bogs to facilitate peat extraction activity from 1988 to June 2020;*
ii. *Vegetation clearance to facilitate peat extraction activity from 1988 to June 2020;*
iii. *Industrial scale peat extraction (milled peat and sod peat/moss), specifically at Ballivor, Carranstown, Bracklin, and Lisclogher Bogs from 1988 to June 2020;*
iv. *Use and maintenance of pre-existing ancillary supporting infrastructure and services to facilitate peat extraction and associated activities (e.g., railway infrastructure, fixed fuel tanks, drainage (drains, silt ponds, pumps), machine passes etc.), from 1988 to present day;*
v. *Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0501-01) which commenced from April 2000 onwards to the present day;*
vi. *All associated site development and ancillary works.*

4.2.1 Project Phases

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

- **'Peat Extraction Phase':** peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June of 2020 (July

1988 – June 2020). The Peat Extraction Phase is described in detail in **Sections 4.4 to Section 4.7.**

- **'Current Phase':** the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in **Section 4.7 and 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 **Section 4.9.**

4.2.2 General Overview of the Peat Extraction Process

4.2.2.1 Surveying and Drainage

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

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

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

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

- Initial opening of drains:
  - Drains were first opened by a plough pulled by a Bord na Móna tractor at a slow speed (approx. ½ to 1 mile per hour (0.8km/h – 1.6km/h)); and
  - The drain depth at the plough stage was 20″ (0.51m). Drains had a trapezoidal section with a top width of approx. 30″ (0.76m) and a bottom width of 12″ (0.3m) bottom width.
- Deepening of drains:
  - Following their initial opening, drains were deepened by rotating disc machines operating at speeds of 200-600 yards per hour (approx. 180-550m/hour).
  - Rotating disc machines could deepen the drains to a maximum depth of approx. 60″ (approx. 1.5m), with a bottom width of approx. 12″ (approx. 0.3m); and

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

- Whether further deepening of drains was required depended on the purpose of the drain was achieved by smaller-type bucket excavators and peat cutting machinery, by drag lines specially tracked to Bord na Móna's design, by several other excavator types, or by hand where it was desired that the drain should conform to certain maximum dimensions.

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

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

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

4.2.2.1.1 *Drainage and Bog Preparation Machinery*

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

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

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



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

Drainage Machine Type – Klassmann

The Klassmann drainage machine was designed and developed for operation on sod moss production bogs. The machine was supplied with a variety of attachments to suit specific duties. For Bord na Móna's applications it was fitted with a slit drainer, a drain cleaner and a levelling screw. The tractor was of light construction with the chassis fabricated from folded steel sections supported on two tracks each comprising two chains carrying steel swamp shoes, running on end sprockets and frictionless bearing mounted intermediate support rollers. The power unit was an air-cooled diesel engine and the transmission consisted of an over-centre single plate clutch, vee belt drive, specially designed four speed gearbox, and chain drives which powered both tracks and the power take off (PTO) for attachments. Additional sprockets were supplied to give a variety of forward speeds to suit specific attachments. Steering was assisted by coil clutch and brake bands. The machine was fitted with a hydraulic system to control the transmission of power to the various attachments. All controls were centralised in an enclosed cab.

The slit drainage attachment was used to open initial drains in virgin bog. It comprised a cutting boom of small buckets carried on special chains and sprockets. The content of the buckets was discharged mechanically into a vane-type spinner which threw the spoil clear of the drain. The drain cleaner attachment was similar to the slit drainer but cut a wider drain and was used to deepen and maintain drains after the first sod cut was made. The screw leveller attachment was used for the preparation of fields on moss peat bogs to remove the vegetation and level the surface to facilitate the performance of cutting machines and the stability of the sod walls formed by these machines. The attachment had the ability to camber surfaces if required.

Drainage Machine Type – M.P. Field Slitter

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



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

Ditching Attachment – Milled Peat Type – Disc

The purpose of this attachment was to cut the drains separating the milled peat fields in development bogs and deepen existing drains in production bogs. The attachment consisted of a rotating cutting disc set at an angle to the line of travel, carried on an arm from the tractor unit. The arm and disc were controlled and supported by wire ropes and a hydraulic ram passing over a mast on the tractor unit and anchored to a projecting ballast box on the other side of the tractor unit. The disc was driven by

the tractor main gearbox PTO shaft via a bevel gear reduction box and universal propeller shaft. On other machines a chain drive reduction was inserted between the bevel gearbox and universal propeller shaft to achieve a slower disc speed. The disc had cutting blades and a stationary shield which deflected the flying spoil away from the machine and spread it evenly over the adjacent field.

Drain Cutting Attachment – Cross Drain

The purpose of this attachment was to cut small drains in milled peat fields from the centre of the field to the ditches separating the fields. The attachment consisted of a cutting boom which was mounted on the rear of the H.D. Tractor Type II on radius arms, controlled for height and level by hydraulic rams. To cut the drain, the tractor stopped, and the cutting boom started, trimmed for level if necessary and lowered into the bog, discharging the spoil to the centre of the field. The boom was of light construction using standard steel sections. The chain was carried on sprockets at the ends of the boom while it ran in a guide with the aid of welded-on cleats along the bottom horizontal portion of the boom. The drive is taken from the PTO shaft of the tractor main gearbox via chain drivers and universal jointed propeller shaft. Plate 4-3 below is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-3 Drain Cutting Attachment – Cross Drain. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/drain-cutting-attachment-cross-drain/

Drain Cleaner – Screw

This attachment was used to remove slurry from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field. The attachment was a screw elevator with radial blades fitted at the top to eject the spoil through an outlet in the casing in a predetermined direction. The attachment was mounted on a cantilevered bracket from the tractor on a pivot arrangement so that the screw casing could be lifted and lowered as required by winch rope. In the working position the screw elevator is lowered into the ditch and scooped the slurry from the bottom of the ditch as the tractor advances. As

the tractor progresses along the ditch or drain it accumulates the slurry; the screw elevated it into the discharge chamber and the radial blades ejected it through the outlet onto the peat field. Plate 4-4 below is an image of this type of machinery operating on a Bord na Móna bog.



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

Stripping Machine Type – I & II

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

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

The Type II machine was powered by a diesel engine driving through an over-centre type clutch, a 'V' rope drive special worm and spur gear reduction box, and chain drives. The machine was steered by coil clutches on the track final drives. There were 6 forward speeds available using change sprockets. Plate 4-10 is an image of this type of machinery operating on a Bord na Móna bog. Plate 4-5 below is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-5 Stripping Machine. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/stripping-machine/

Levelling Machine Type – Scraper

The purpose of this machine was to prepare the surface of the high bog and cutaway for the efficient operation of all other machines, by levelling it. The machine consisted of a large tractor unit carrying a leveller boom in front. As the machine advanced on its long tracks, the boom cut away the high areas, losing the spoil in the hollows. The tractor unit had a rigid main frame supported on caterpillar type power driven tracks and was powered by diesel engine and gear transmission of standard manufacture. The boom had a light framework made up of standard steel sections, around which was driven two conveyor-type chains running on sprockets at each end and in guides along the bottom and top. Across these two chains, arms were fitted, projecting beyond the front of the boom. The projecting portion of the arm had a cutting knife and scraper palm. The boom was controlled for height and level by hydraulic rams. Plate 4-6 below is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-6 Levelling Machine Type – Scraper. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/levelling-machine/

4.2.2.2 Peat Extraction Process

Three distinct peat products were extracted at the Application Site: sod peat, milled peat, and sod moss. The methods by which these products were extracted varied, and each process is described in detail in the sections below. A description of the machinery used for peat extraction activities and all ancillary works at the Application Site is provided in Section 4.2.2.2.

4.2.2.2.1 *Sod Peat Extraction*

Sod peat, also sometimes referred to as 'machine turf', was extracted utilising technologies developed between 1910 and 1920. The sod peat was initially supplied as a fuel product for both domestic and industrial uses. Once drainage was installed and the bog surface suitable for use by machinery, the bog surface was prepared using levelling and stripping machines (Plates 4-5 and 4-6). Sod peat extraction was subsequently carried out by a range of different bagger/sod peat excavator machines[4]. The German word for both 'excavator' and 'dredger' is 'Bagger' and this was the word adopted in Ireland for machines which mixed the peat from different depths of the bog and then macerated it (Plate 4-21).

In the case of sod peat extraction, large open drainage ditches known as "trenches" were opened at widths of approx. every 240 metres across the entire width of the extraction area. These trenches served as the beginning of the face bank from which sod peat was ultimately extracted. Baggers cut a trench with a width of 2 meters and a depth of 3 to 4 meters. A chain of buckets on the bagger was then inserted into the trench which extracted peat from all strata of peat in the trench. The extracted peat was then deposited into a macerator which pulped and mixed it. Maceration improved the quality of the sods of peat produced, as by thoroughly mixing peat from each strata of the bagger trench, the

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

density and uniformity of the sod was increased. The macerated peat pulp was then extruded through a narrow double mouthpiece which formed it into two rows of continuous sods each of approx. 5 inches (approx. 13cm) wide x 3 ¾ inches (approx. 9.5cm) high. As they were extruded, the rows of peat were deposited on to a continuously moving chain of spreader plates, which when the spreader arm was fully loaded, tripped automatically and deposited the rows of turf onto the bog surface. Trailing discs then cut the rows into 15 inch (approx. 38cm) long sods. The standard length of the spread arm was 54 metres. A short video of the last bagger that was operational on the Application Site can be viewed at: https://www.youtube.com/watch?v=nNcitG0WKPs. The bagger/sod peat excavator machine spread the sod peat on the large area between the trenches which allowed sufficient room to dry the sod peat and allow for processing and collection later in the season when the sods had dried.

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

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

The large drainage trenches were continuously developed and have a width of between 3 to 8 metres typically and a depth of around 2-5 metres. They were maintained using mechanical excavators or draglines and were continuously deepened as sod peat was extracted from the bog to lower the drainage level.

After about two weeks on the surface of the bog, the sods were turned by a sod turning machine[5] to allow the other side of the sod to dry. When the sods were fully dried, the density and uniform texture resulting from the maceration process made them very impervious to rewetting. The dried sod peat was then collected from the surface of the bog using a sod collector. This machine was used to collect the sod peat from the sod rows into stockpiles which were often referred to as 'ricks'. A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the Bord na Móna landbank. When it was decided to move a stockpile, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required. Please see Plate 4-7 for a Flow Chart of the Sod Peat Extraction Process produced by Bord na Móna.

4.2.2.2.2 *Milled Peat Extraction*

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

Milled peat extracted from the bogs supplied horticulture peat for the manufacture of growing media products for the professional and retail markets. Milled peat extraction requires good solar/wind drying conditions and so commenced any time from mid-April and usually ran until mid-August, once suitable

[5] https://www.bordnamonalivinghistory.ie/equipment-detail/sod-turning-machine/

drying conditions prevailed. Following drainage, there were four stages to the production of milled peat:

1. **Milling** - During the milling process the top 10-15 mm of the surface of each field was broken into peat crumbs by powered milling drums towed behind agricultural tractors. This layer of crumbed or milled peat is called a crop and has a moisture content of about 80% when milled. Please see Plate 4-8 for details.
2. **Harrowing** - After milling, the peat crop was dried. To assist in this drying, the loose peat was harrowed, or turned over. The harrow consisted of a series of spoons which are towed behind an agricultural tractor. The spoons on the harrow were fitted with special base plates which prevented the scraping of wet particles from below the milled peat layer. Harrowing was usually required 2 to 5 times per peat crop, depending drying conditions, the water table level in the peat extraction fields, the initial moisture content of the peat at milling, and peat quality. If rain interrupted the drying process, more harrowing may have been needed. Please see Plate 4-9 for details.
3. **Ridging** - When the milled material was dried to a moisture content of between 45% and 55%, it was gathered into ridges in the centre of each peat extraction field. The ridger consisted of a pair of blades towed in an open V behind an agricultural tractor. The open V blades rest on the bog and channel the loose crop into a triangular ridge in the centre of each peat extraction field. Please see Plate 4-10 and Plate 4-11 for details.
4. **Harvesting** - Harvesting is the final stage of the milled peat extraction process. Each individual ridge was lifted mechanically by a machine called a harvester, transferred and dropped on top of the adjoining field's ridge, until five ridges had been accumulated into a single large ridge. This ridge forms the final lift into the peat storage stockpile.

The 'Peco' stockpiling method was practised at the Bracklin, Ballivor and Carranstown bogs whereby the eleventh field, i.e., one field in between two groups of five fields, was retained for stockpiling peat from the neighbouring ten fields. The extraction-stockpiling cycle is referred to as a 'harvest' and each group of eleven fields generally produced 12 No. harvests per year. When the production season was over, the stockpiles were covered to keep the peat dry unless the peat was scheduled for immediate transportation from the site for sale or use. Peat was stored in these stockpiles (up to 25 m wide, 10 -15 m high) until required for use. Please see Plate 4-12 to 4-14 for details.

A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the Bord na Móna landbank. As in the case of sod peat stockpiles, when it was decided to move a stockpile of milled peat, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required. Please see Plate 4-7 for a Flow Chart of the Milled Peat Extraction Process produced by Bord na Móna.

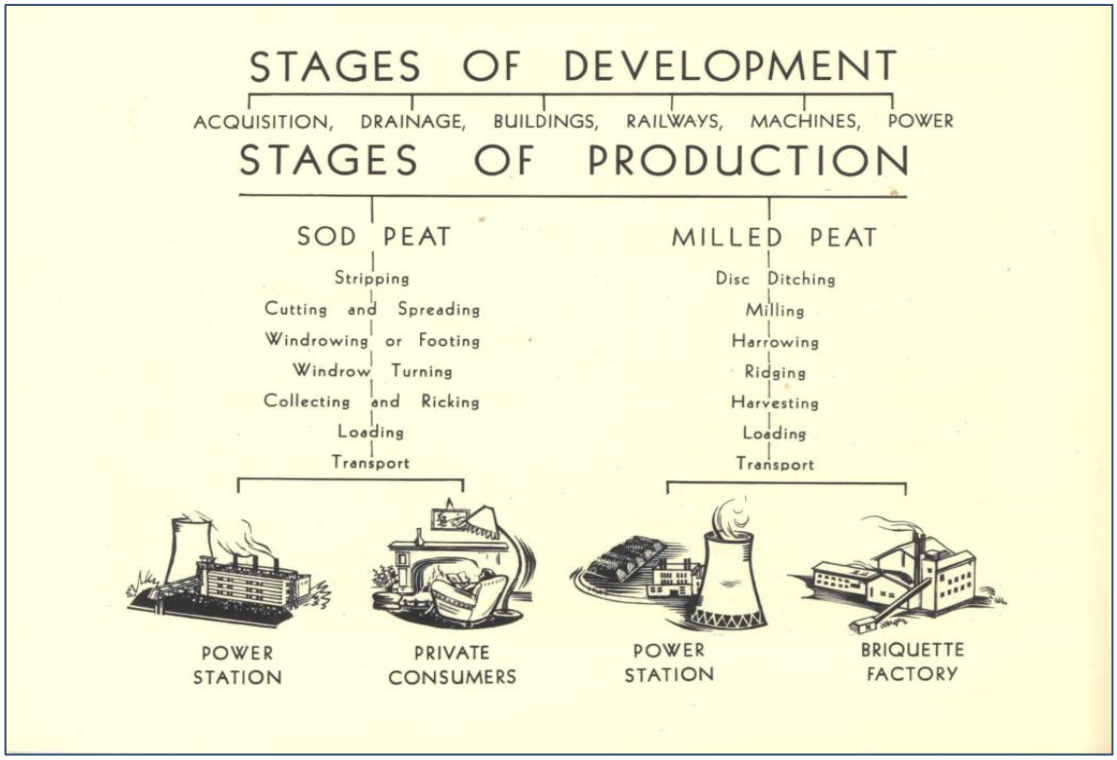


Plate 4-7 Flow Chart of the Sod and Milled Peat Extraction Process produced by Bord na Móna in 1954



Plate 4-8 Milling process. Image: Bord na Móna



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



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



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



Plate 4-12 Harvesting -Peco method. Image: Bord na Móna



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



Plate 4-14 Stock Protection. Image Bord na Móna

4.2.2.2.3 Sod Moss Extraction

'Sod moss' is the term used to describe peat produced in block form for horticultural use. Sod moss is made up of incompletely humified mossy or fibrous peat consisting mainly of sphagnum moss, cotton grass and other vegetable fibres. When dry, sod moss is very light and able to absorb and retain moisture to over ten times its dry weight. It is this characteristic which makes it ideally suitable for horticulture.

To facilitate the extraction of sod moss, bogs were drained using a system of longitudinal drains opened at intervals of approx. 7.5 metres. The drainage process was slow, and it took between five and seven years to prepare a bog before the extraction of sod moss could commence. The sod moss extraction season generally extended from June right through the winter and early spring. The peat was cut in sods, but not macerated as was the case with sod peat as described in Section 4.2.2.2.1. Unlike both sod and milled peat, sod moss was left out in peat extraction fields over the winter, so that it could be subjected to the action of frost and rain. Sod moss which has been frozen in winter dries more quickly in the spring and it remains looser while doing so and it is, therefore, more easily disintegrated. It is also more absorptive than sod moss which has not been subject to frost. Rain helped to improve the quality of the sod moss by washing away humified particles of peat.

Following drainage, sod moss was extracted mechanically with specially equipped excavators. The sods were cut from mini face-banks or the margins of trenches that were gradually widened and left on the bog to dry for approx. 12 months, reducing moisture content from 90% to between 50% and 60%. Once the required moisture content was reached, the sod moss was stockpiled at the edge of the bog prior to transportation via rail for processing. One layer was typically cut at a time until the sod moss deposit was exhausted. Please see Plate 4-15 and Plate 4-16 for details.



Plate 4-15 Sod Moss Extraction (left) and Sod Moss stockpiles (right). Images Bord na Móna



Plate 4-16 Sod Moss drying (left), Sod Moss stockpiles (right). Images Bord na Móna

4.2.2.3 Peat Extraction Machinery

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

4.2.2.3.1 *Tractors*

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

H.D. Tractor II

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



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

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

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



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

LHT Tractor III

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

Ridger Tractor (LHT IV)

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

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



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

Massey Ferguson 35

The Massey Ferguson (MF) 35 would have been used from the 1960s and 1970s. It has a rated engine power of approx. 37 horsepower (hp). The MF 35 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It is commonly equipped with a 6-speed or 12-speed gearbox, depending on the model and design. It has a hydraulic system with a variable capacity. The tractor's weight is approx. 1,500kg.

Ford TW15

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

Landini 5830

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

Ford F4630

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

New Holland TL70/TL70a

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

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

New Holland TM150

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

New Holland TM165

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

New Holland TM140

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

John Deere 5070M

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

4.2.2.3.2 Sod Peat Machinery

Windrow Machine

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

Sod Turning Machine

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



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

Sod Peat Bagger/Excavator

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



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



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

Cutaway Boom Attachment

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

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

The catchment conveyor, supported from the boom frame, was a rubber/canvas conveyor belt running on conventional driver, end roller, and troughing idlers. The section of the belt receiving the turf from the buckets was supported on a series of slides of self-lubricating nylon to prevent deflection of the belt and ensure more efficient sealing. The conveyor had an independent motor/gearbox drive. The catchment conveyor discharged into the original scraper conveyor of the main machine. The attachment could be readily fitted to or removed from the machine by five pins. Plate 4-23 is an image of this type of machinery operating on a Bord na Móna bog.



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

Sod Peat Loading Machine

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



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

Fóidín Machine

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



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

Sod Moss Peat Collector

The purpose of the machine was to collect the dried moss peat sods from the drying grounds by hand feeding and convey them to the storage rick. Two passes of the machine cleared a belt of 700 feet (approx. 213m) wide to form one rick.

The construction of the machine was unique, as it was carried on caterpillar-type tracks which supported it through hydraulic rams and facilitated travel over partly-cut bog while maintaining the machine in the horizontal position.

The machine consisted of a rubber canvas conveyor belt in two sections, the running gear of which was carried in a robust structure fabricated in four sections from square hollow section steel; this conveyor was suspended from high masts on either side of the main frame of the machine. The main frame was of rigid design to resist diagonal loading; fabricated in square and circular hollow section steel, all main members were pin jointed to facilitate dismantling for transport. The tracks comprised a framework of castellated beam construction around which two conveyor-type chains carried the steel swamp shoes.

In addition to hydraulically tilted tracks, the conveyor sections on either side of the machine and the elevator section were raised and lowered hydraulically. Plate 4-26 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-26 Sod Moss Peat Collector. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/moss-peat-sod-collector/

Chain Saw Excavator

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

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

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

A pair of loaded rollers were trailed behind the cutting sword to close the top of the excavation just made, preparing the spread ground for the next run of the machine. In this way, all available bog could be covered with spread turf, leaving only nominal spaces between the extrusions. Plate 4-27 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-27 Chain Saw Extractor. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/chain-saw-excavator/

4.2.2.3.3 *Milled Peat Machinery*

Miller Attachment

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

Single Miller Attachment

Single miller attachments consisted of a simple but strong tubular steel frame, the main members of which extended to, and were pivoted, at the mid-position of the tractor tracks. Rigidly mounted on the underside of the frame was a pin-type milling drum which was driven from the tractor PTO shaft through a bevel gearbox and chain drive. The single miller attachment was supported by a ground roller, through springs, located immediately in front of the milling drum and by a depth control castor a few feet behind the milling drum. For idle travel, the single miller attachment was lifted by hydraulic ram so that the pin milling drum is clear of the bog surface. This attachment, by virtue of the sprung main supporting roller, caused the milling drum to cut deeper on the hills and shallower in the hollows, thus having a levelling effect on the bog surface. The drive to the milling drum is protected by a tension bolt safety device. Plate 4-28 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-28 Single miller attachment. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/

Triple Miller Attachment

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

The triple miller attachment consisted of units similar to the single attachment, ganged together. The front centre unit was attached to the tractor drawbar, while the two side rear units were drawn by brackets from the side of the front centre unit frame. These brackets were pivoted, and the level of the front of the side unit frame was controlled by roller castors running on the bog surface. The drives to the three milling drums were by universal jointed propeller shafts with splined slip sleeves, two bevel gearboxes and final chain drives. The milling drum speed was lower than the single unit, but in all other respects the behaviour of the individual units is the same as the single miller attachment. For idle travel the units were lifted on hydraulic rams incorporated in the rear castor roller assemblies. Depth of cut was also adjusted by these rams from the driving seat. The drive to each of the three units was protected by a tension bolt safety device. Plate 4-29 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-29 Triple miller attachment. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/

Offset Miller Attachment (Type-I)

This attachment was used to form a bevel on the edges of milled peat fields, to assist surface drainage. The attachment was a miller drum, projecting from the rear of the tractor unit on a casing arm which is pivoted at a central position on the rear of the tractor main frame, and extended to carry a ballast weight. The drive was taken from the tractor PTO shaft, through a bevel gearbox which formed the pivot assembly of the arm and a universally jointed propeller shaft extended to the actual milling drum. The milling drum was set backwards as it extended from the tractor so that the spoil was thrown back towards the centre of the milled peat field, where it could be harvested. A supporting trolley fixed to a projecting bracket at the centre of the tractor track and supported on a roller behind the drum, carried the drum arm on an adjustable suspension. The trolley, complete with extension arm and drum could be lifted by a winch rope passing over a mast frame mounted on the tractor. For bogs in early development a bladed drum was used, while a pin drum was used on production bogs. Plate 4-30 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-30 Offset (Type-I) Miller attachment. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/miller-attachment/

Harrow

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

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

The harrow was fitted with a spoon lifting gear. Each spoon arm was connected to a miniature beam over each bank of spoons. A wire rope from the centre of this beam passed over a supported pulley and secured to a special frame on the rear of the tractor. The standard tractor hydraulics actuated this frame to lift or lower the spoons as required. Plate 4-31 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-31 Harrow. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/harrow/

Harvester

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

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

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

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

The belt conveyor was partly constructed on the structural framework connecting the spiral unit and tractor unit, including the conveyor drive pulley, and partly on the tractor unit, and the remainder formed the jib, projecting from the machine. While flat carrying idlers were used for the receiving end of the belt, flexible shaft type troughing idlers were used over the articulated portion, and conventional type troughing idlers on the jib. At the discharge end of the jib, a moveable deflector was fitted to control the trajectory of the peat.

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

The driver of the machine could raise or lower the jib and the trailing boards and raise the spiral casing completely off the bog surface by hydraulics and control the jib deflector by a simple rope winch. Plate 4-32 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-32 Harvester. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/harvester/

Milled Peat Loading Machine

The purpose of this machine was to load milled peat from peat stockpiles into railway wagons. The machine consisted of a tractor unit carrying a ground spiral on the front, extending either side of the bottom shaft was a bucket elevator which sloped back over the tractor unit. As the buckets overtopped the top sprockets of the elevator, they discharged onto a rubber belt conveyor which discharged into the railway wagons. Plate 4-33 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-33 Milled Peat Loading Machine. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/loading-machine/

4.2.3 Ancillary Services and Infrastructure

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

- Workshops;
- Works offices;
- Welfare Facilities;
- Mobile fuel tanks;
- Fixed fuel tanks;
- Peat loading facility; and,
- Railway infrastructure

With the exception of railway infrastructure, the remaining ancillary infrastructure is located outside of the Application Site boundary and as such substitute consent is not being sought in respect of this ancillary infrastructure. Nonetheless, in order to provide as detailed a description as possible of the Project, all of the ancillary infrastructure is described below.

4.2.3.1 Workshop

The Ballivor Works (also referred to as 'the Works') provided a central location for support services to the adjacent bogs and includes workshops, offices and welfare facilities such as toilets and a canteen. Staff parking is provided at the Ballivor Works, and it was the central location for management of the activities within the Application Site. It is now under third party lease and is not supporting current onsite activities.

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

A machine and wheel wash facility is also located at Ballivor Works. Machine washings generated due to the cleaning of various plant machinery (using a power steam wash system when machinery left the bogs) at wash bays drained into the adjacent peatlands drainage system.

4.2.3.2 Works Offices

The offices at Ballivor Works provided an administration centre for the Application Site and other bogs within the wider bog group. Permanent administration staff were employed throughout the Peat Extraction Phase from the time of construction of these buildings.

4.2.3.3 Welfare Facilities

Welfare facilities were also provided across the Application Site. These typically took the form of small buildings and temporary structures to provide workers on peat extraction fields a clean area to take lunch/tea breaks and provide welfare facilities. While facilities were available at the Ballivor Works offices, these smaller outposts were situated across the Application Site to provide easier access to workers further away from the central works buildings. Any remaining welfare facilities will be decommissioned as required as part of the IPC Licence decommissioning plans.

4.2.3.4 Fuel Storage

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

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

4.2.3.5 Peat Loading Facility

A sod moss peat loading facility is provided within the Ballivor Works yard. This facility received planning consent from Westmeath Co. Co. in 1983 (Ref. 382/83) and was subsequently opened in 1985. The facility was designed to allow for the bulk distribution of peat moss from the Application Site by compressing the peat into shipping containers for delivery to the horticulture industry overseas.

4.2.3.6 Railway Infrastructure

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

The Annual Report of 1951 indicates that Bracklin Bog was listed for development with expenditure earmarked for railway infrastructure as well as drainage, buildings and other ancillary items. In 1952-53, a railway connection between Ballivor and Bracklin commenced and was completed in 1956-57. Aerial photographs from 1973 indicate that railway infrastructure connecting Ballivor Bog, Carranstown Bog, Bracklin Bog and Lisclogher Bog was in place by this time. No railway infrastructure was laid down in Lisclogher West Bog. Please see Figure 4-1 below.

As discussed in Section 4.2.2.2, the track sleepers were approx. 1.8m in length and 0.76m apart. The total length of permanent track in the Ballivor bogs is 18.9km. The remaining track is termed temporary track, i.e., it was lifted and laid up to 12 times in a year for transport of extracted peat from stockpiles.

There are no rail underpasses at the Application Site. However, there are two at-grade level crossings, one at the Ballivor-Raharney road (since designated R156 in 1993), to facilitate train crossing from Ballivor Bog to Carranstown Bog and vice versa and one to facilitate crossing from Bracklin Bog to Lisclogher Bog across a local road. This level crossing went out of use post-cessation of peat extraction activities and all ancillary works at the Application Site. Standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all Bord na Móna crossing gates. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trans before reaching the level crossing.

The Bord na Móna railway infrastructure was designed to be moveable, supporting infrastructure that was laid to facilitate the transportation of peat off the bogs and into the Ballivor Works for processing. Once peat stocks were exhausted from one area, the temporary tracks were taken up and re-laid in new areas of bog which had entered production. Thus, over the decades the railway line layout changed shape regularly. Furthermore, as areas fell out of permanent production, some railway lines were taken up completely.

4.2.3.7 Railway Equipment

Extracted peat was transported from stockpiles on the Application Site via a series of permanent and temporary railway tracks to Ballivor Works for processing. The equipment which facilitated the installation and maintenance of the railway tracks, as well as the equipment used to transport peat on the railway lines, are described below. A map of the railway network at the Application Site is presented in Figure 4-1.

Rail Shifter

A rail shifter was an attachment fitted on to tractors which was used to lift temporary railway tracks in sections and build them onto bolster bogies for transport to a new area. The rail lifter consisted of a lightly constructed main frame supported on two bogies and an overhead lattice work beam supported from the main frame to allow the passage of the rail sections through the machine. When seven sections were built on the bolster bogies, they were hauled away by a locomotive. Plate 4-34 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-34 Rail Shifter. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/rail-shifter/

Rail Moving Attachment

The purpose of the rail moving attachment was to lift and lay temporary railway track along sod peat ricks and milled peat piles. The attachment was fitted to a tractor and consisted of an A-frame jib pivoted on a bracket secured to the track frame of the tractor and braced back at the top by wire rope to a projected ballast box on the other side of the tractor. A short jib was used for sod peat operations while a longer and a longer jib was used for milled peat operations. Plate 4-35 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-35 Rail Moving Attachment to lift and lay temporary railway track, along Sod Peat ricks and milled peat piles. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/rail-moving-attachment/

Locomotive 80HP (Wagonmaster)

The locomotive hauled peat from the stockpiles across the Application Site to Ballivor Works for processing. The locomotive was powered by a water-cooled diesel engine driving through a fluid coupling, automotive type clutch, standard automobile change speed gearbox, a special reversing bevel/spur reduction gearbox and drive and coupling rods to the wheels. The main frame was fabricated steel plate. The axles ran in self-aligning double row roller bearings in cast steel housings sliding in horn guides with manganese steel wearing faces. A cab of generous size was included, with a tumbling-type seat to facilitate driving in both directions. The clutch control pedal was duplicated for the two driving positions. The braking system was mechanical hand operated. The locomotive was fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Plate 4-36 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-36 Locomotive with wagons. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/diesel-locomotive/

Wagons

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

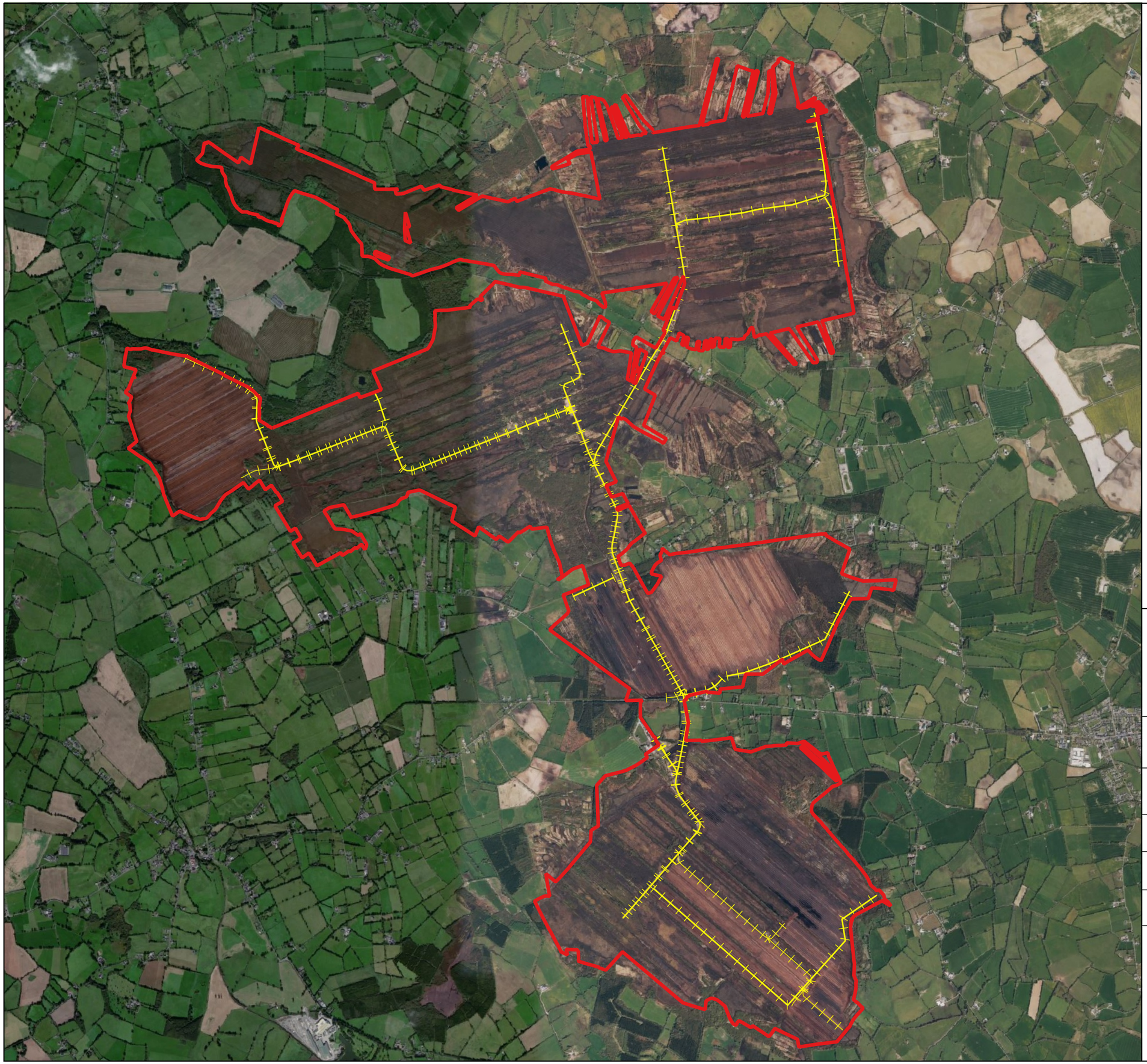
The use of aluminium to fabricate the sides and floor of milled peat wagons reduced the unladen weight of the wagon when compared to heavier materials such as wood and steel, and therefore facilitated a greater payload (i.e. a greater amount of peat) to be transported per train. Furthermore, the use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

Rail Car

Rail cars were used by the Manager or authorised members of his staff, to make inspection tours of the bog. Rail cars were equipped with first-aid equipment and also worked as a bog ambulance if needed. Rail cars were fitted with a water-cooled petrol engine, the power from which was transferred through an automotive clutch to a gearbox, and then transferred to each axle via a chain drive. Beam lights and electric windscreen wipers were fitted at each end of the rail car and a short-wave radio transmitting and receiving set enabled the occupants to keep contact with the Works and the larger machines that were fitted with radio units on the bog. Plate 4-37 is an image of this type of machinery operating on a Bord na Móna bog.



Plate 4-37 Rail Car. Sourcehttps://www.bordnamonalivinghistory.ie/equipment-detail/rail-car/



Map Legend

- Application Site Boundary
- Railway Network

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Drawing Title: Railway Network at the Application Site	
Project Title: Ballivor Substitute Consent Application	
Drawn By: NS	Checked By: EC
Project No.: 191137f	Drawing No.: Figure 4-1
Scale: 1:35,000	Date: 2024-07-16

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4.2.4 Site Services

Water consumption across the Application Site is primarily at the Ballivor Works for domestic use. The water supply at Ballivor Works is from a bored well supply on the Application Site.

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

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

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

In addition to the above, other materials consumed as part of the peat extraction activities and all ancillary works would have been polythene sheeting for covering stockpiled peat, timber and steel for the rail lines, gravel for the rail beds etc.

4.3 1948 to June 1988 – Initial Development & Peat Extraction (Pre EIA-Directive)

4.3.1 Site Description 1948 (Pre-Extraction)

Prior to the commencement of drainage, which occurred first on the Application Site in Ballivor Bog in 1948, the Application Site was covered by an active raised bog, with the surface being wet, acidic and deficient in plant nutrients, with open Sphagnum-dominated vegetation. Raised bogs are accumulations of deep acid peat where peat can range from 3-12m deep. The “raised bog” name is derived from the elevated dome which develops as the bog grows due to the accumulation of peat. Pre-development topographies would have been higher (in the ranges of 75 - 89mOD) than those observed today, with the remnant areas of high bog located around the perimeter of the Application Site and in Lisclogher West Bog at present resembling pre-development ground elevations more closely.

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

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

Prior to 1988, all bogs within the Application Site were fully or partially drained and Ballivor, the western part of Carranstown, Lisclogher, and Bracklin were subject to peat extraction.

During the Peat Extraction Phase of the Project, only minimal land use change occurred which predominantly related to minor annual topographic changes caused by ongoing peat extraction activities and all ancillary works. While peat extraction activities and all ancillary works were ongoing it was not possible to rehabilitate the underlying peatland.

4.3.2 Drainage and Peat Extraction

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. As outlined above, Ballivor Bog was the first bog to commence clearance and drainage in 1948 and would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1953. Clearance and drainage work commenced in Bracklin Bog in 1950 and peat extraction commenced there in 1957. Clearance and drainage of Lisclogher Bog began in 1950, with peat extraction commencing in 1960. Annual reports indicate that peat extraction was already underway at Ballivor, Bracklin (main area) and Lisclogher by the 1960s. The earliest aerial mapping available (1973) confirms that by this period, drains were already inserted at Ballivor, Bracklin and Lisclogher Bogs. Aerial imagery from 1988 indicates that by this period, drainage was inserted at Carranstown and in the west of Bracklin. However, drainage was not completed at Lisclogher West by 1988. The Application Site was mapped as a raised bog in the Peatland Map of Ireland produced by the National Soil Survey in 1978[6]. Figure 4-2 below presents an overview of the peat extraction activities and all ancillary works on the Application Site in 1973, which has been deduced from the earliest available aerial mapping for the Application Site. i.e 1973 aerials included in Appendix 4-4.

As discussed above, drainage ditches to drain the upper surface of the bogs by lowering the local water table were inserted across the Application Site at different stages throughout the decades (please see Table 4-2 below and Section 4.2.2.1 for years of drainage insertion and details on drainage construction methods practiced at the Application Site). After the bogs were drained, vegetation clearance was undertaken across Lisclogher, Ballivor and parts of Bracklin and Carranstown Bogs prior to 1988. It is estimated that prior to 1988, approx. 1,248 hectares (ha) across Ballivor, Bracklin, Carranstown, and Lisclogher Bogs were cleared, drained and subject to peat extraction, and a total of 380ha (predominately in the east of Carranstown bog, the northern portion of Bracklin bog, as well as edges of Ballivor and Lisclogher) were drained, but not cleared of vegetation or subject to peat extraction. This assumes the entire surface of these bogs was covered in vegetation (part of the acrotelm) and it was cleared over a period of time from all bogs except Lisclogher West Bog, which was drained but never subject to peat extraction.

The topography of the Application Site prior to peat extraction activities and all ancillary works is estimated to have been 72 - 89mOD. This is deduced from the present-day topography range for Lisclogher West Bog (which was never subject to peat extraction), the relatively uniform low-lying nature of the Application Site and surrounding landscape, and the presence of benchmarks noted on historical 25" OSI mapping (1897-1913 and) Cassini 6" (1940s) of the area. It is assumed that prior to the installation of drainage to facilitate peat extraction activities and all ancillary works, the Application Site was virgin bog and was therefore an active raised bog.

The primary and greatest land-use change associated with the peat extraction activities and all ancillary works on the Application Site occurred during the initial drainage and vegetation removal of the bogs in advance of peat extraction activities and all ancillary works. This impact would have predominantly occurred in advance of 1988 at the Application Site. A photographic accompaniment illustrating the types of activities described below can be found in Appendix 4-10 *Bord na Móna: Peat Development in Ireland 1954.*

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

Table 4-2 Peat extraction activity timelines taken from Annual Reports (1951 – 1970, 1984 to 1987)

Bog		Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Began	Extraction Ceased
Ballivor		1948	1953	June 2020
Carranstown	**Western portion of Carranstown**	1974-1987	By 1988* (Western side)	June 2020
	Eastern portion of Carranstown	1974-1987* drainage inserted only 1989-1995* Clearance works	By 1995	June 2020
Bracklin	**Main Bracklin Bog area**	1950	1957	By 2003
	Western portion of Bracklin	1979-1988, drainage inserted throughout Bracklin West By 1988 vegetation clearance in southern portion only	Between 1985 and 1995* at northern portion of Bracklin West By 1988* at southern portion of Bracklin West	June 2020
Lisclogher		1950	1960	March 2003 for milled peat. Sod peat (third party) was extracted in the northeast until 2020.
Lisclogher-West		Minor works commenced in 1973 Main Drainage installed between 1973 and 1988 Drainage was complete post 1988*	N/A	N/A

*Indicated by aerial photography which are included Appendix 4-4 of this rEIAR;

Table 4-3 describes the general activities within the Application Site over a calendar year during each of the four quarters from 1953 when peat extraction activities and all ancillary works commenced to June 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season. Fuel handling and refuelling would have increased significantly during the peat extraction season due the increased activity of the peat extraction machinery.

Table 4-3 Annual Peat Extraction Activities 1953 - June 1988

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

N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

- Application Boundary

1973 Peat Production

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

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
1973 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	Figure No:
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4.3.3 Peat Extraction Volumes 1953 – June 1988

Peat extraction commenced at the Application Site in 1953. An estimate of the volumes produced during that period was determined based on the number of bogs in production, the estimated area in production and an average of production tonnages over the 1954 to June 1988 period. Peat extraction volumes are not available for 1953. On the basis that peat extraction only commenced at the Application Site in 1953, it is assumed that the volumes generated were not significant and not comparable to the volumes generated in subsequent years. The volumes of peat removed from the Application Site varied from year to year with a general and gradual increase with time as more of the Application Site was developed and became available for peat extraction activities and all ancillary works. Fluctuations in peat extraction volumes are generally attributable to weather conditions in any given year, with wetter weather resulting in lower volumes of peat extraction due to poorer ground conditions for operating machinery, and poorer peat drying conditions; conversely, dryer weather usually resulted in higher volumes of peat extraction due to better ground and drying conditions. Bord na Móna records indicate that approx. 1,626,398 tonnes (sod and milled combined) were extracted from the Application Site for the period 1954 to June 1988 inclusive. Figure 4-3 and Table 4-4 below outlines the peat extraction tonnages over the 1954 to June 1988 period.

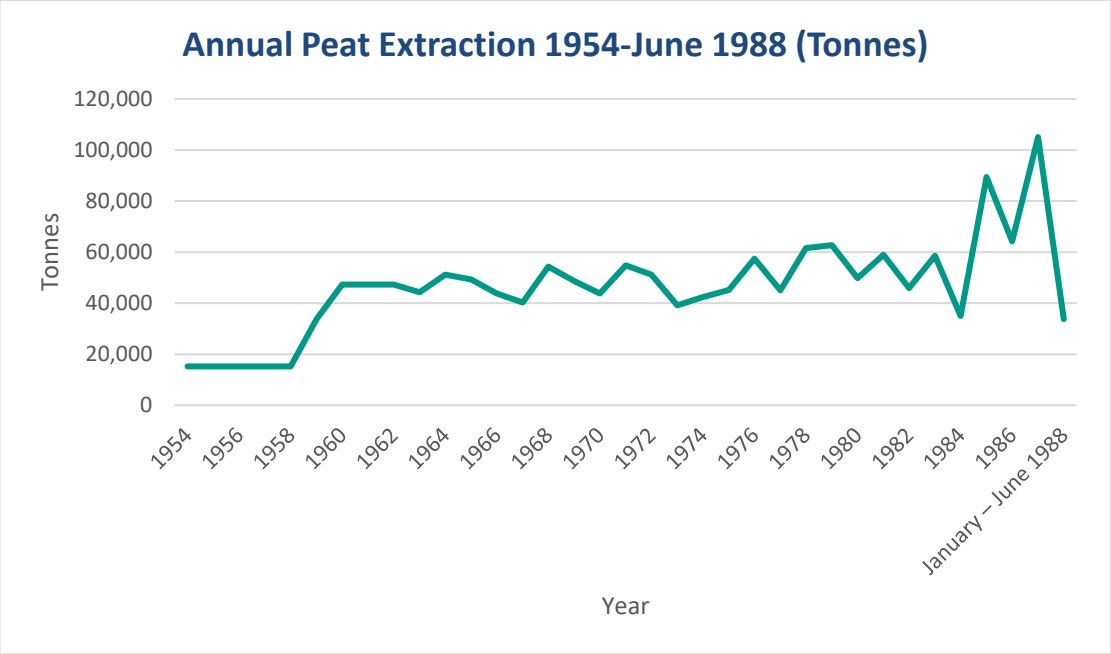


Figure 4-3 Annual Peat Extraction Volumes (Tonnes) 1954 to June1988 (peat volumes not available for 1953)

Table 4-4 Peat Extraction (Tonnes) 1954 to June 1988

Year	Tonnes	Year	Tonnes
1954	15,203	**1971**	54,805
1955	15,203	**1972**	51,113
1956	15,203	**1973**	39,135
1957	15,203	**1974**	42,435
1958	15,203	**1975**	45,145
1959	33,739	**1976**	57,372
1960	47,293	**1977**	44,980
1961	47,293	**1978**	61,526
1962	47,293	**1979**	62,698
1963	44,225	**1980**	49,815
1964	51,152	**1981**	58,898
1965	49,228	**1982**	45,855
1966	43,713	**1983**	58,496
1967	40,261	**1984**	35,044
1968	54,286	**1985**	89,356
1969	48,590	**1986**	64,142
1970	43,714	**1987**	105,060
		January – June 1988	33,721
Total Volume Extracted (tonnes)	**1,626,398**		

As outlined in Table 4-2, Ballivor bog was the first bog to come into production after a 5-year period of drainage and acrotelm removal. Ballivor bog remained the only bog in subject to peat extraction until 1957, when peat extraction commenced in Bracklin bog. This was quickly followed by Lisclogher in 1960. Peat extraction volumes were mainly influenced by the weather conditions that prevailed during the specific production seasons. Carranstown bog was brought into production in 1985 and this, combined with good weather conditions resulted in an increase in peat extraction volumes at the Application Site to a maximum of 105,060 tonnes in the 1987 season. The 1988 January to June peat extraction volume has been extrapolated by halving (i.e due to the 6-month period) the total tonnes of peat extracted for 1988. The latter half of the year 1988 (i.e July to December) is identified in Table 4-6 below.

Records indicate that the Derrygreenagh Bog Group, of which the Ballivor Bog Group, and thus the Application Site, is a subset, supplied peat to the Rhode ESB Power Station, Croghan Briquette Factory

and to the Kilberry and Cúil na Móna horticultural peat processing facilities when required. Information regarding which bogs supplied which specific end user, quantities of supply, frequency of travel and travel routes are not available. From 1985, peat from the Application Site was also distributed in bulk from the peat loading facility at Ballivor Works to the horticulture industry overseas via Dublin Port.

4.3.4 Drainage Design

As part of the development of Ballivor, Lisclogher and Bracklin for milled peat extraction, parallel surface water drains as per the methodology outlined in Section 4.2.2.1.1 were created by machine excavators at intervals of 15m and the strip of bog between these drains were retained to form the peat extraction 'fields'. The Application Site bogs are primarily drained via gravity with two pumps located at the margins of Ballivor Bog. By 1987 drainage ditches, outfalls and pumps were extant at Lisclogher, Bracklin and Ballivor bogs.

Ballivor Bog

Drainage works first commenced in Ballivor Bog by in 1948. The earliest available aerial photograph dating from 1973 shows Ballivor Bog to be under sod peat extraction with an area of high bog in the east and south that has already been ditched in preparation for peat extraction.

Carranstown Bog

Drainage channels were inserted at Carranstown bog in 1979 as evidenced by aerial imagery, with extraction underway only in the western portion of the bog at this time. Aerials from 1995 indicate that by this time the bog was producing milled peat in the west and east of the bog.

Bracklin Bog

Annual Reports indicate that drainage work began at Bracklin Bog in 1950. By 1973, aerials indicate that sod peat extraction in the main bog area. Aerial imagery indicates that by 1988 all of Bracklin West, excepting a small southern section of the Western portion of Bracklin Bog which only had vegetation clearance, had drainage inserted but extraction was only underway in the southern portion of this area.

Lisclogher Bog

Annual Reports indicate that drainage operations commenced at Lisclogher in the late 1950s, with the bog going into sod peat extraction in 1960.

Lisclogher West Bog

The installation of main drainage commenced in 1973, as evidenced by aerial imagery. Aerial imagery from 1988 indicated that drainage installation was ongoing by 1988. No peat extraction took place on Lisclogher West bog.

4.3.5 Control Measures pre-July 1988

With the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.9 below), formal documentation outlining dedicated measures referred to as control measures practised on site from 1948 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the 1999 IPC Licence application.

4.3.5.1 Peat Harvesting Machinery – Maintenance Programmes and Storage

1. All peat harvesting machinery listed above in Section 4.2.2.3 were stored at the Ballivor Works at the end of the workday;
2. All machinery were regularly inspected serviced and maintained;
3. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release; and,
4. Self-contained machine parts washer was located at the Workshop.

4.3.5.2 Refuelling Facilities

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

1. When a spill occurs, the General Manager must be immediately informed of the incident;
2. The spill must be assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences;
3. If there is a risk of explosion, all personnel in the area must be evacuated from the area;
4. The spill should be sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%);
5. All effort should be made to prevent the spill from entering a storm drain or nearest outfall;
6. Once the spill has been contained, a suitable absorbent (dry peat) is to be used to soak the spillage;
7. 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;
8. Follow up action measures taken must include the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and,
9. In the event of a significant spillage, the General Manager must notify the local authority.

4.3.5.3 Fire Safety

1. Annual training provided for bog fires crew and factory personnel and all general staff are provided with a minimum of 2 hours training in fire prevention;
2. Fire exits should be designated. These doors should be fitted with push-bar mechanisms only and lighted form independent sources. They shall be unobstructed inside and outside at all times and open outwards;
3. Each canteen/office equipped with a fire blanket and fire extinguisher;
4. There should be at least 1 fire point at all office premises;
5. Petrol and other oils should only be stored in designated oil stores;
6. Batteries should not be charged in working areas unless suitable protection is provided;
7. Training provided for Oxygen cylinder storage and use;

8. Fire Wagons: Designated rail wagons for fire prevention which contain: hoses, shovels, fire beaters, baskets, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers etc.;
9. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat. This prevented spontaneous combustion of certain peat types by excluding air as much as possible; and,
10. Fire Safety Audits undertaken at six monthly intervals along with random audits. Yearly assessments of all audits

4.3.5.4 Dust Management at Bog Boundaries and Headlands

Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. Tree cover along the fringes of bogs minimised the amount of dust that would travel off-site. In 1976 Bord na Móna established a policy to preserve the vegetation and tree cover on all bog fringes and on any mineral islands. (Brown Gold 'A History of Bord na Móna and the Irish Peat Industry', 2010 Clarke, Donal, Chapter 10 Pg 206). In addition, the following measures were undertaken at a minimum to minimise dust emissions and later expanded under IPC licence.

1. Stockpiles were compacted on either side by large rollers drawn by 65H.P tractors;
2. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
3. Avoid extraction during windy weather;
4. Keep headlands clean- remove loose peat;
5. Drive slow along dusty headlands; and,
6. Clean road crossing.

4.3.5.5 Internal Rail Network Maintenance

Railway tracks and railway locomotives underwent continuous inspection and maintenance to prevent de-railments, fires, accidents and fuel leaks. The locomotives were fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Wagons were also designate as fire safety wagons and were stocked with various fire safety paraphernalia including hoses, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers.

4.3.5.6 Surface Water Management

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

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

4.3.5.7 Maintenance Programme for Internal Drains

1. Internal drains cleaned on a regular basis in suitable weather. This was necessary to remove sludge from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field;
2. Drain maintenance was carried out using draglines and excavators;

3. These works were programmed to ensure that the drainage servicing the harvesting areas were fit for purpose; and,
4. Drain maintenance was carried out mainly prior to and post the harvesting season

4.3.5.8 Maintenance of Onsite Surface Water Pumps

1. Visual inspection of pumps daily;
2. Operational check of pumps biweekly; and,
3. Service of pumps monthly

4.3.5.9 Silt Management

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

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

A copy of a memo sent to Ballivor Works from the Bord na Móna Production Manager in March 1976 setting out the recommendations of the silt committee is included in Appendix 4-8, which directs that *"at all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended"*. Further Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980s in response to the 1977 *Water Pollution Act*.

Silt ponds were installed to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated

from the production fields and collected in the bog drainage network as well as run-off from workshop areas.

Silt ponds were designed and constructed, primarily, with a width of 8m, however, in some cases, silt ponds of up to 12m in width were constructed. The larger silt ponds up to 12m wide are only provided in areas where access is available to both sides of the silt ponds for cleaning. The length of the silt pond varies depending on the capacity required (i.e., the length is proportional to the area of catchment being drained). In some locations, baffles (i.e., obstructing panels or vanes) have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. Silt ponds are generally excavated to a depth of 1.5m below the pipe invert level, however in some locations, due to restricted space, the silt pond depth is greater than this. Low-velocity flow through the silt pond is generally controlled by inlet and outlet pipes at the silt ponds or upstream of the silt pond. These pipes control the velocity of the flow into and out of the silt ponds so that the velocity within the silt pond itself is less than 0.1 m/sec. This slow flow through the pond allows suspended sediment (mainly peat) particles to fall out of suspension and build up on the base of the pond, thereby reducing the sediment loading of the outflow from the pond. The principle behind the design of the silt ponds is an application of Stoke's Law. Stokes' Law describes how small solid particles move through a viscous fluid, stating that the drag force on these particles is directly proportional to their size, velocity, and the fluid's viscosity. The silt ponds are cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points to the adjacent surface watercourse. Access to the silt ponds is via headlands and machine passes which were created to facilitate vehicle movements within the site. Figure 4-4 below presents the typical silt pond design of those that were implemented on the Application Site.

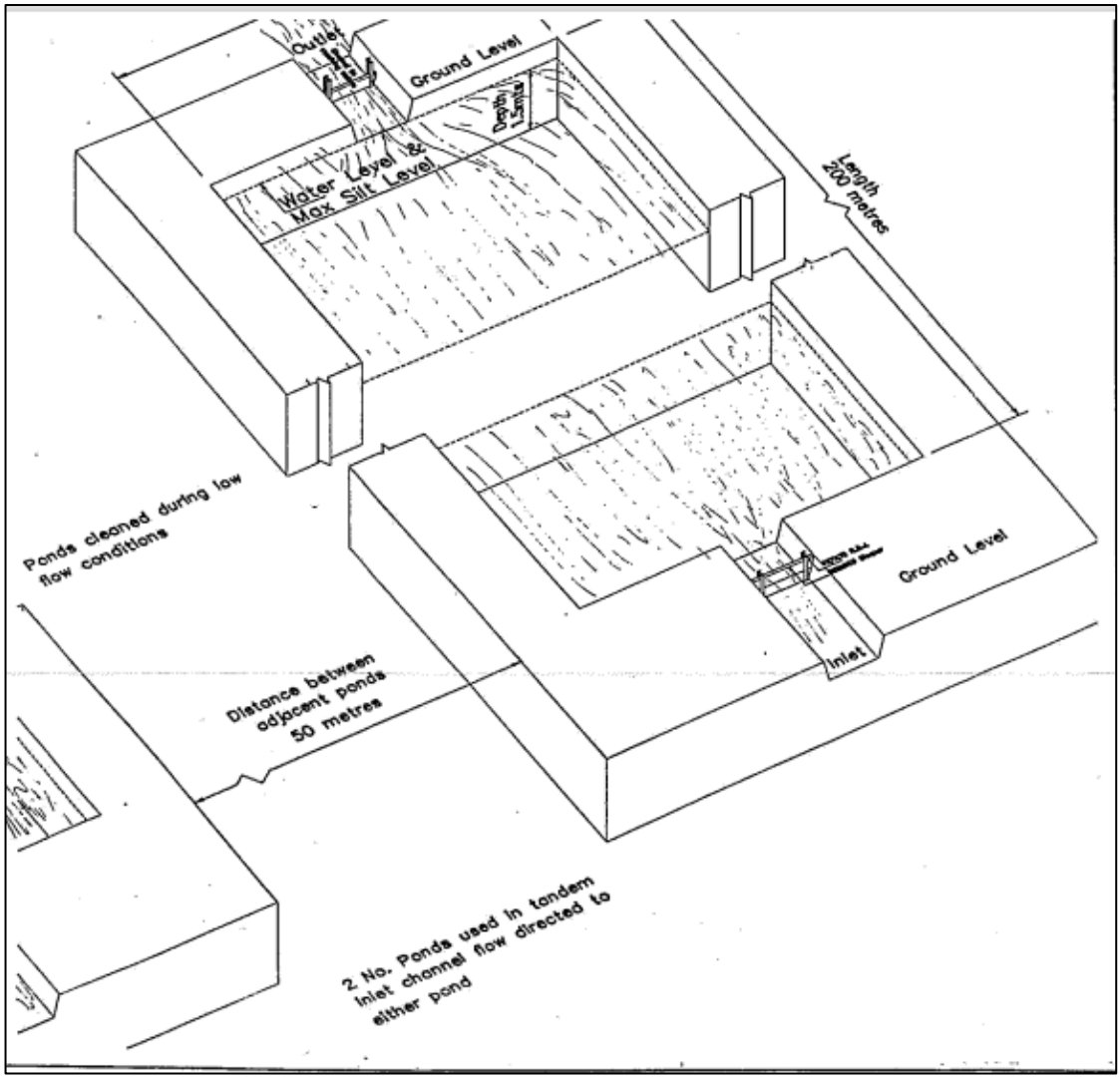


Figure 4-4 Typical Silt Pond Design Implemented at the Application Site. Source IPC Licence Application to EPA 1999

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

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

4.3.5.10 Waste Management

1. Waste oils and break fluids drained from machinery during servicing were collected in drums and emptied to a designated waste oil storage tank;
2. Waste oil storage tank contents transported off-site by a licenced waste disposal contractor.
3. Oil and fuel filters changed at vehicle service intervals;
4. Spent filters collected and disposed thorough a waste disposal contractor;

5. Used batteries are collected by battery collection contractor;
6. Off-washings form the self-contained machine parts washer was collected within a sludge tank at the Works;
7. Ash from the onsite boiler was stored in a skip onsite and collected by a licenced contractor and taken to landfill;
8. Waste polythene removed from stockpiles was collected at the roadside by plastic recycling company; and,
9. Workshop waste and general refuse from canteens/offices were historically burned on site or disposed into waste disposal areas at the Works. This practise changed to the use of skips which were then collected by licenced contractors.

4.3.5.11 Archaeological Disturbance

1. As part of peat processing training, all bog employees must read and adhere to the recommendations 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942; and,
2. All bog workers must stop all works and report to the Bog Manager if archaeological finds are encountered. If materials thought to be of archaeological interest are encountered, the Bog Manager must report the findings to the Garda Síochána within 7 days who will then contact the Commissioner of Public Works.

4.4 July 1988 - rEIAR Baseline

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

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

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

As detailed in Section 4.3.3 above, the 1988 July – December peat extraction volume has been extrapolated by halving (i.e due to the 6-month period) the total tonnes of peat extracted for 1988. The first half of the year 1988 (i.e January to June) is identified in Table 4-4 above. The total tonnage of peat extracted at the Application Site from July-December 1988 was 33,721 tonnes. The total tonnage of peat extracted for January-December 1988 is 67,442 tonnes. This is below the annual average for the 1988 to 2020 period which would indicate that it was not a particularly good year for peat extraction. For comparison, the following year (1989), a record level of 117,755 tonnes of peat was extracted at the Application Site. The estimated topography of the Application Site in July 1988 is based on an average depth of milled peat extraction of 0.1m per year over a 32-year period, which has been worked back from the 2020 topography. As most of the Application Site was subject to milled peat extraction, this approach is considered to be the most robust in determining the peat height in 1988.

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

4.4.1 Site and Activity Description - July 1988 rEIAR Baseline

By July 1988, land use at the Application Site was well established as industrial peat extraction. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in place. The main entrance points to the Application Site were located north and south off the Ballivor-Raharney (R156) road. and the machine pass/rail crossings between Brackiln and Lisclogher bog. The Ballivor Works, which comprised a peat processing plant, canteen, storage sheds, and maintenance buildings, was located in the north of Ballivor Bog, where it is still located in present day. The following ancillary infrastructure was established at the site by July 1988:

- Railway infrastructure (all bogs within the Application Site except Lisclogher West);
- Internal machine passes/tracks (all bogs within the Application Site except Lisclogher West);
- Bulk Loading Facility at the Works of R156 in Ballivor Bog (Planning Grant 1983);
- Workshop and extension at the Works of R156 in Ballivor Bog (Planning Grant 1977);
- Covered Loading Bay at the Works off R156 in Ballivor Bog (Planning Grant 1972);
- Silt ponds and drains (all bogs (apart from Lisclogher West) within the Application Site); and,
- Two pumps at Ballivor Bog and one pump at Lisclogher Bog (Decommissioned by 2000).

4.4.1.1 Ballivor Bog July 1988

Satellite imagery and annual reports indicate that by July 1988, approx. 473ha of Ballivor Bog were undergoing sod and milled peat extraction. Thus, the main landcover type at this time was cutover peat. Several small areas measuring approx. 165ha of remnant uncut raised bog were located predominantly at the edges of the bog. Drainage was already installed, predominantly in a northwest-southeast orientation and two pumps were in operation. Railway infrastructure was laid in the bog (since the 1950s), terminating at the Works building located in the north of Ballivor Bog, just off the Ballivor-Raharney (R156) road. The Works area housed several peat processing buildings, canteen and welfare facilities, waste storage areas, carparking facilities and a refuelling area. Ballivor Bog included 7 no. artificial silt ponds, and 7 no. surface water emission points which remain *in situ* today. The Clondalee More stream flows out from the southwest of the bog. The main access point to Ballivor Bog was off the Ballivor-Raharney (R156) road adjacent to the Works area. The topography of Ballivor Bog is estimated to have been approx. 74m – 82mOD by July 1988.

4.4.1.2 Carranstown Bog July 1988

Aerial imagery from 1988 indicates that drainage was in place and extraction of milled peat was underway on approx. 80ha in the western portion of Carranstown Bog. A total of 117ha were drained but not subject to peat extraction. Carranstown bog was linked via railway infrastructure to Ballivor Bog to the south, and to Bracklin Bog to the north-west. The bog included 5 no. artificial silt ponds, and 4 no. surface water emission points which remain *in situ* today. Areas of remnant uncut raised bog remained intact (approx. 187ha), predominantly at the edges of the bog. The Killaconnigan River runs along the southern boundary of Carranstown Bog. The main access point to the Carranstown Bog was to the south of the Application Site via the Ballivor-Raharney (R156) road, which remains the main access point today. The topography of this bog is estimated to have been approx. 72 – 78mOD by July 1988.

4.4.1.3 Bracklin Bog July 1988

By July 1988, peat extraction was underway across most of Bracklin Bog, (approx. 351ha). Areas of remnant uncut raised bog remained intact across Bracklin Bog (approx. 363ha), predominantly at the edges, with approx. 58ha of Bracklin Bog drained but not yet subject to peat extraction. Drainage for both milled and sod peat extraction was already installed, and railway infrastructure, which was laid throughout the 1950s and 1960s, connected Bracklin Bog to Carranstown Bog (to the south) and Lisclogher Bog (to the north). Bracklin Bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *in situ* today. The main access point to Bracklin Bog is off a local road at the northeast of the bog or internally from the south through Carranstown Bog. The topography of Bracklin Bog is estimated to have been approx. 75m – 89mOD by July 1988.

4.4.1.4 Lisclogher July 1988

By July 1988 Lisclogher bog had been drained and sod peat extraction was underway across 378ha of the bog, with an estimated 101ha of raised remnant intact bog remaining. Railway infrastructure was also *in situ*, connecting Lisclogher Bog to Bracklin Bog to the southwest. Access to the Lisclogher Bog in 1988 was via the local road to the west of the bog to the machine pass adjacent to the rail crossing, and this remains the main access point at present day. This local road, which runs in a southeast-northwest orientation, defines the western boundary of Lisclogher Bog and separates Lisclogher Bog from Lisclogher-West. The topography of Lisclogher Bog is estimated to have been approx. 73 – 79mOD by July 1988.

4.4.1.5 Lisclogher West July 1988

Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approx. 22ha, as deduced from available aerial imagery. This area was never subject to peat extraction. An area of 106ha of Lisclogher West Bog was never subject to drainage or peat extraction works and therefore, the landcover in 1988 comprised mainly natural raised bog with raised bog features such as high bog, wet flush areas and bog woodland particularly at the bog borders. The bog includes 6 no. silt ponds and 2 no. surface water emission points. The Cartenstown stream flows in a west-to-east direction through the bog and the Bolandstown stream flows west-to-east along the southern boundary of the bog. Access to Lisclogher West Bog was and remains via a local road which runs through the bog in an east-to-west direction, or via a local road which defines the eastern boundary of Lisclogher West bog and separates Lisclogher West Bog from Lisclogher Bog to the east. The topography of the bog is estimated to have been approx. 77 – 82mOD by July 1988. An esker runs east-west adjacent to the along the northern bog boundary.

N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

Application Boundary

1988 Peat Production

Subject to Peat Extraction

Drained - Not Subject to Peat Extraction

Neither Drained nor Subject to Peat Extraction

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
1988 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	Figure No:
BNM-PG-20-01-26_v4	1:30,000	JG	09/07/2024	4-5

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4.4.2 1988 Peat Extraction Activities

Table 4-5 describes the general activities within the Application Site (with the exception of Lisclogher West bog, which was drained but not subject to peat extraction) over a calendar year during each of the four quarters in 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season. Fuel handling and refuelling would have increased significantly during the peat extraction season due the activity of the peat extraction machinery. Records indicate that the Derrygreenagh Bog Group, of which the Ballivor Bog Group is a subset and the Application Site is located, supplied peat to the Rhode ESB Power Station, Croghan Briquette Factory, Kilberry and Cúil na Móna when required. Information regarding which bogs supplied which specific end user, quantities of supply, frequency of travel and travel routes are not available. From 1985, peat from the Application Site was also distributed in bulk from the peat loading facility at Ballivor Works to the horticulture industry overseas via Dublin Port.

Table 4-5 1988 Peat Extraction Activities

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

4.4.3 July 1988 to 2020 (Drainage, Peat Extraction & Associated Activities)

As demonstrated above, by July 1988 peat extraction was well established at Lisclogher, Bracklin and Ballivor bogs and underway in the western portion of Carranstown bog. Peat extraction was never commenced at Lisclogher West bog. Drainage was installed in all bogs and railway infrastructure was laid on all bogs as required.

Drainage construction methodologies are described above in Section 4.2.2.1.1.

4.4.3.1 Ballivor

Extraction in the northwestern and southwestern part of Ballivor bog ceased by 1995 and these areas have since become revegetated predominantly with dry heath and Birch scrub, with some localised wetter areas where field drainage was not maintained and has broken down and become partially blocked. These areas have developed embryonic bog communities with abundant Sphagnum cover. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway so far has been quite effective. Other parts of the bog are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Aerial photographs from 1995 indicate that Ballivor Bog was still undergoing sod and milled peat extraction. The east, northeast and south of the bog was undergoing milled peat extraction while part of the centre was undergoing sod peat extraction. By 2000, the western portion of the bog was no longer subject to peat extraction. The remaining areas of the bog

remained in active peat extraction until 2020 and these areas are dominated largely by bare peat. The bog includes 7 no. artificial silt ponds, and 7 no. surface water emission points which remain *in situ* today. The 2 no. on-site pumps have been decommissioned. The topography of the bog today ranges from approx. 70 – 79 mOD.

4.4.3.2 Carranstown

Between 1989 and 1995, portions of Carranstown east were cleared and under milled extraction. as indicated in aerial imagery. There were 5 no. silt ponds and 4 no. surface water emission points installed. Today, the bog still retains a dome shape though much of the section was developed for milled peat extraction and a large proportion of the bog comprises bare peat due to continued extraction until 2020. Small areas to the east and west, which were initially developed for milled peat extraction but never fully put into production have since revegetated with Birch and pine scrub and dense bracken covering significant areas presently. Two mineral islands are also located within the bog dominated by hazel, Birch and oak woodland. Birch dominated woodland and remnant raised bogs are also present to the south-east and east of Carranstown. The topography of the bog today ranges from approx. 68 - 75m OD.

4.4.3.3 Bracklin

By 1989 extraction was underway across Bracklin West. By 1995 largescale extraction in the main Bracklin bog area ceased and since then, the majority of the main Bracklin Bog area has since heavily revegetated with typical cutaway habitats. The remnant peat left on site is relatively deep and has allowed acidic vegetation communities to develop including abundant Sphagnum cover in specific areas where drainage is impeded. Despite this overall Sphagnum cover remains low. Bracklin contains a relatively large area of remnant raised bog at its southern margin and a large section of cutover bog currently developing into Birch woodland. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway so far has been quite effective. Other parts of the bog (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. Natural re-colonisation of the cutaway so far has been quite effective. An area of marginal raised bog remnant (19 ha) was restored at Bracklin Bog in 2016, as part of the Bord na Móna Raised Bog Restoration Programme. The bog includes 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *in situ* today. The topography of the bog today ranges from approx. 71—86 mOD.

4.4.3.4 Lisclogher

By 1995 milled peat extraction was well underway at Lisclogher. This process ceased in 2003. Since this period, the bog has been out of production except for third-party extraction in areas covering approx. 70ha and some sod production in the northeast. Since 2003, recolonisation of vegetation has taken form. Overall, the site has begun to become colonised with cutaway vegetation such as pioneer fen and Birch scrub. Some of this is quite well established with habitats stabilising. The old rail lines are still clearly visible on the bog as narrow, high ridges that contain habitats such as pioneer poor fen and Birch scrub. The former production fields are lower than most of the Application Site and contain open water in the wettest places with Common Bog Cotton having developed in the majority of the old production fields. Drainage on the Application Site had begun to break down with many old drains having become blocked and full of water, some drains contained *Sphagnum cuspidatum* while other drains contained Reedmace, Bog Cotton and rushes (mainly Soft Rush). As discussed above, habitats present in 1988 at the bog edges remain the same today. Access to the bog is via the local road to the west which separates it from Lisclogher-West. The bog includes 1 no. artificial silt pond and 1 no. surface water emission points which remain *in situ* today. The topography of the bog today ranges from approx. 69 - 76mOD.

4.4.3.5 Lisclogher West

Remaining drainage elements were installed between 1988 and 1995, as deduced from available aerial imagery. However, as mentioned previously, Lisclogher West bog never underwent peat extraction and therefore, the landcover in 1988 comprised mainly natural raised bog with raised bog features such as high bog, wet flush areas and bog woodland particularly at the bog borders. An esker runs east- west adjacent to the along the northern bog boundary.

Most of the margins have been abandoned or unmanaged for some time and extensive Birch woodland and mixed conifer woodland has developed. Some of this Birch woodland is particularly well-developed and Scot's pine is a prominent feature of much of the woodland around the bog. The 2nd edition OSI 6-inch map illustrates most of the margins as conifer woodland, indicating that this woodland may not have developed naturally but was probably planted at some stage. This map also indicates that woodland or wooded sections on the high bog were more extensive in the past and some areas have been cleared or reverted to high bog, indicating that there has been a relatively long history of forestry around this bog. The topography of the bog today ranges from 77- 82m OD. As the bog was not brought into peat extraction it is assumed that the existing topography is representative of the topography in 1988. The Cartenstown stream flows in a west-to-east direction through the bog and the Bolandstown stream flows west-to-east along the southern boundary of the bog. Access to the bog was and remains via a local road which runs through the bog in an east-to-west direction or via a local road which separates Lisclogher West bog from Lisclogher bog.

Since July 1988, 6 no. silt ponds and 6 no. surface water emission point were inserted into Lisclogher West bog. The absence of production has meant that Lisclogher-West has retained many of its natural raised bog features (raised bog, cutover bog, conifer plantation, birch woodland, mixed broadleaf woodland, scrub, poor fen and flush). It can be inferred that if the other four bogs were never brought into production, similar habitats at these bogs would be present today.

4.5 Peat Extraction

Peat extraction, under the same processes described in Section 4.2.2 above, continued at the Application Site from July 1988 until June 2020 when peat extraction ceased across the Application Site. Improvements and modernisation of machinery occurred between 1988 and 2020 which increased the efficiency and speed of operations over this time period. There were significant developments in diesel-powered engines which would have resulted in the use of more fuel-efficient tractors on the bogs with significantly cleaner exhaust emissions compared to the baseline year of 1988 or pre-1988.

For the Peat Extraction Phase, i.e from July 1988 to June 2020, peat extraction gradually slowed down and then ceased permanently in June 2020 across the Application Site with the related reduction in fuel handling/refuelling, machinery maintenance and stockpile development. Stockpile removal was completed in 2023, and drainage/silt pond maintenance is currently ongoing.

Peat extraction maps for the years 1995, 2004 and 2020 are presented in Figures 4-6 to 4-8 and illustrate the activity on the Application Site over time and the increasing areas of lands which were no longer subject to peat extraction. Figure 4-8 shows that most areas were out of production in 2020. Aerial images for the years 1995, 2000, 2004, 2015 and 2018 are included in Appendix 4-4 where the Application Site boundary has been overlain and natural regeneration of land cover can be seen on the areas of the bogs which were not in production.

N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

Application Boundary

1995 Peat Production

Subject to Peat Extraction

Drained - Not Subject to Peat Extraction

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
1995 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	Figure No:
BNM-PG-20-01-27_v4	1:30,000	JG	09/07/2024	4-6

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N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

Application Boundary

2004 Peat Production

Subject to Peat Extraction

Drained - Not Subject to Peat Extraction

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent
2004 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	Figure No:
BNM-PG-20-01-28_v3	1:30,000	JG	09/07/2024	4-7

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N

Lisclogher West

Lisclogher

Bracklin

Carranstown

Ballivor

Legend

Application Boundary

2020 Peat Production

Drained - Not Subject to Peat Extraction

Subject to Peat Extraction

0 0.5 1 2 Kilometres

Bord na Móna

Ballivor Substitute Consent 2020 Peat Extraction Activities

DRWG No:	Scale:	Drawn by:	Date:	Figure No:
BNM-PG-20-01-29_v3	1:30,000	JG	09/07/2024	4-8

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4.5.1.1 Peat Extraction Volumes July 1988-June 2020

The volumes of peat removed from the Application Site varied from year to year and were mainly weather dependent. The tonnages of peat extracted are outlined in Figure 4-9 and Table 4-6 below:

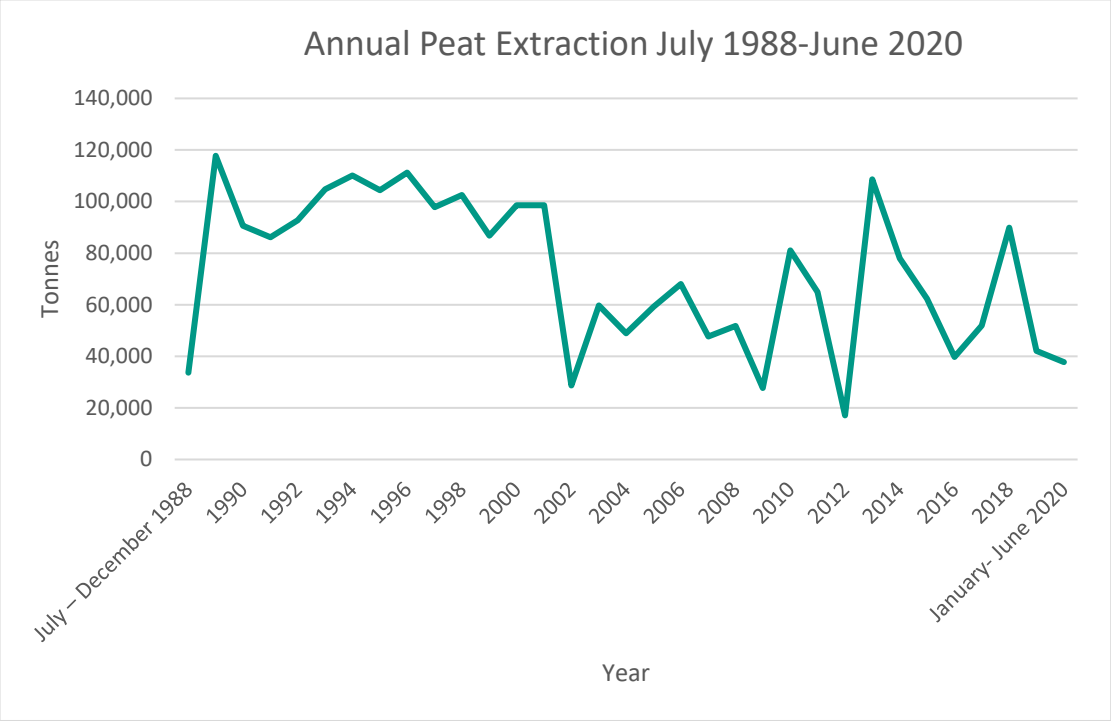


Figure 4-9 Annual Peat Extraction Volumes July 1988- June 2020

Table 4-6 Peat Extraction July 1988- June 2020 (Tonnes)

Year	Tonnes	Year	Tonnes
July – December 1988	33,721	2005	59,251
1989	117,755	2006	68,069
1990	90,583	2007	47,637
1991	86,190	2008	51,829
1992	92,744	2009	27,721
1993	104,742	2010	81,062
1994	110,074	2011	64,951
1995	104,384	2012	17,095
1996	111,260	2013	108,605
1997	97,800	2014	77,968
1998	102,495	2015	62,267

Year	Tonnes	Year	Tonnes
1999	86,749	**2016**	39,730
2000	98,610	**2017**	51,844
2001	98,610	**2018**	89,839
2002	28,640	**2019**	42,115
2003	59,737	**January- June 2020**	37,782
2004	48,956		
Total Volume Extracted (tonnes)	**2,400,815**		

Bord na Móna records indicate that from July 1988 and until 1999 inclusive, on average 1,138,497 tonnes of peat (sod and milled) were extracted from Ballivor, Brackin, Lisclogher and Carranstown bogs. There are no peat extraction records for the period 2000 to 2001 inclusive. In determining the overall peat extraction volumes from July 1988 until June 2020, an average of the 1990 to 1999 extraction figures was used for the 2000 and 2001 seasons (i.e. 98,610 tonnes). Records indicate that on average, 58,058 tonnes of peat were extracted each year from 2002 to 2020. The total volume of peat extracted from July 1988 to 2020 is estimated to be 2,400,815 tonnes.

In 2020, 37,782 tonnes of peat were extracted all the bogs within the overall P0501-01 IPC Licence area. The Application Site form a subset of the IPC Licenced bogs, and therefore the actual volumes produced at the Application Site were significantly less than this figure. This drop was due to the fact that peat extraction both commenced and ended in the month of June 2020 for the whole Derrygreenagh Bog Group, of which the Ballivor Bog Group is a subset, and thus the Application Site is located.

Until June 2020, peat was supplied to Kilberry Horticultural Works, Derrinlough Briquette Factory, West Offaly Power Station and Edenderry Power Plant in Co. Offaly, and Lough Ree Power Station in Co. Longford. Since June 2020, peat from the remaining onsite stockpiles has been supplied to Kilberry Horticultural Works, Edenderry Power Station and Derrinlough Briquette Factory only.

The above figures do not include third party peat extraction volumes, which are referenced in Section 4.5.4 below.

4.5.2 Drainage Systems July 1988 – June 2020

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

Machinery used for drainage works would have been largely the same as that described in Section 4.2.2.1.1 with ever-improving engine efficiency in tractors and excavators.

Silt Ponds

A number of existing silt ponds at the Application Site were in place prior to July 1988 as described in Section 4.3.5.9.

A total of 25 no. silt ponds are currently in place across the five bogs: 7 at Ballivor, 6 at Bracklin, 5 at Carranstown 1 at Lisclogher, and 6 at Lisclogher West. Upgrades to silt ponds were undertaken at the Application Site following a 1990 survey undertaken by Bord na Móna which involved a daily sampling and analysis programme at different locations in the Bord na Móna landholdings over a full calendar year to determine the quantity of silt within the runoff from bogs (Harkins Report Appendix 4-9). The study determined that an average of 50m^3 of sludge per hectare was typically discharged. Following this, the silt ponds were designed to cater for the settling of sufficient amounts of silt providing the ponds were de-sludged at least twice per annum. A second pond was installed adjacent to the first to facilitate de-sludging (i.e., used as a backup when the first pond reached silt storage capacity and underwent de-sludging).

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

4.5.3 Annual Peat Extraction Activities July 1988- June 2020

Table 4-7 below describes the primary activities within the bog group over a calendar year during each of the four quarters.

Table 4-7 Annual Peat Extraction Activities July 1988 – June 2020

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

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

Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season. Fuel handling and refuelling would have increased significantly during the peat extraction season due the increased activity of the peat extraction machinery. During the Peat Extraction Phase, peat extraction volumes gradually reduced across the Application Site, before ceasing in June 2020. During the period of gradual decline in peat extraction volumes, a corresponding decline in fuel handling/refuelling, machinery maintenance and stockpile development was observed. Stockpile removal was completed in 2023, with the maintenance of drainage infrastructure ongoing at present. Further detail on this is provided in Section 4.8 below which details the Current Phase of the Project.

4.5.4 Third-Party Peat Extraction Activities

With the establishment of the Turf Development Act of 1981 (which amended and extended the rights of the Turf Development Act 1946-1980), Bord na Móna oversaw a private turf development scheme which provided grants to private bog developers. At the Application Site, this third-party peat extraction occurred in Lisclogher Bog only. Third-party sod peat extraction began at Lisclogher Bog in the 1990s and continued until 2020. Over the course of the years, it is estimated that approx. 1,200 tonnes of peat were extracted by third parties from Lisclogher Bog. Milled peat was extracted by Bord na Móna from this bog also during this period. Please see Figure 4-10 for third party peat extraction locations in Lisclogher Bog at the time of cessation.



Figure 4-10 Third Party Peat Extraction Locations

4.5.5 Ancillary Services and Infrastructure

4.5.5.1 Railway Infrastructure

As discussed above, peat extraction areas were served by a dynamic network of narrow-gauge rail tracks, laid down by 1973 in all bogs except Lisclogher West. The temporary railway infrastructure was moved around using the methods described in Section 4.2.3.7 as areas of bog came in and out of production.

The railway line segments in the townland of Grange More, Co. Westmeath, which covers portions of Ballivor and Carranstown Bogs, was given a Protected Structure status (Reference 021-008) in the adopted 2014-2020 and Westmeath County Development Plan 2021 – 2027. Please see Table 4-8 below for further details. This same portion of railway was added to the National Inventory of Architectural Heritage (NIAH) in 2004 and designated as a Protected Structure after this period as the first step to protected structure status is to enter the NIAH record first. Please see Chapter 13 Archaeological, Architectural and Cultural Heritage for more details.

Table 4-8 RPS appraisal of Railway Infrastructure in Grange More Townland, Co. Westmeath

Structure	RPS	Address	Description	Appraisal	NIAH	Rating
Permanent narrow gauge Bord na Móna railway line	021-008	Grange More Townland, Co. Westmeath	Permanent narrow gauge Bord na Móna railway line, erected c.1952, for transporting turf to the Ballivor Processing Plant, Co Meath. Now only used to transport carriages brought in for servicing. Constructed of steel I beams.	*Bord na Móna narrow gauge railways and ancillary structures are an important element of the twentieth century industrial and economic heritage of Ireland. They are a common feature of the landscapes of the Bog of Allen, particularly in Co Westmeath.*	15402102	Regional

The majority of railway infrastructure across the entire Application Site is still present today. The railway lines are regularly maintained. As discussed, the Application Site activities fell under IPC Licence from 2000 onwards. Condition 9.1.15 of this IPC Licence requires biannual inspection and maintenance of the railcars to ensure no damage, leaks, or flaws in that could result in accidental fuel spillage.

4.5.5.2 Machine/Wheel Wash Facilities

Machine washings generated due to the cleaning of various plant machinery (using a power steam wash system when machinery left the bogs) at wash bays drained into the adjacent peatlands drainage system.

4.5.5.3 Refuelling Activities

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

4.5.5.4 Environmental Monitoring

Since April 2000, control and monitoring measures (such as noise, dust, surface water), have been in operation at the application site in accordance with the IPC Licence conditions. These conditions are discussed further in Section 4.7.1.1 below. A copy of the licence is provided in Appendix 4-1. Background to the IPC application and implementation at the Ballivor Bog group can be found in Section 2.2 of Chapter 2 Background.

4.5.5.5 Welfare Facility

The Welfare Facility comprises an 18m by 6m building with 3m by 9m strip foundations, covering approx. 108m^2, adjoining existing Works buildings, in Ballivor Bog, in the townland of Grange More, Co. Westmeath (Reference 88/14).

Available details on the construction materials of the Welfare Facility are as follows:

- ***Roof:*** *33mm profile composite steel panels with polyurethane infill insulation*
- ***Walls:*** *external- 225mm thickness solid block below DPC; Internal 225mm thickness cavity block above DPC ;Partition for kitchen area: 100mm studded partition; external finish: scud and render with nap finish, 300mm high plinth all round.*
- ***Floor:*** *150mm thickness concrete on 2000 visqueen on 25mm consolidated hardcore with anti-crack mesh; approved 12mm thick non slip tiles.*
- ***Windows:*** *7 no high white PVC double glazed*
- ***Foundations:*** *300*900mm strip foundation, 3*12mm bars, 50mm cover*

The building was connected to an existing bored well water supply by this time however there are no construction details available on this well. Conditions attached to the Welfare facility construction and operation pertain to fire safety and ensuring its use for the purpose outlined only.

4.5.5.6 Storage Facilities Extension

The Applicant received permission for a 510m^2 extension to the storage facilities at the Works in 1990 (Reference 90/554). The building measures 70m x 50m area with a 7m elevation. The extension was constructed in 1990 and connected to an existing water supply at the works. The extension is adjacent to the existing bulk storage building.

Available details on the construction materials of the bulk loading facility are as follows:

- ***Roof:*** *Galvanised stell sheeting, PVC finish*
- ***Roof Lighting:*** *Translucent sheeting*
- ***Walls:*** *Galvanised stell sheeting, PVC external face*
- ***Floor:*** *200mm concrete floor laid on 2000 visqueen on consolidated hardcore*
- ***Foundations:*** *stanchion bases 1200mmx 1200mm x 600mm depth at 300mm below ground level reinforced with 20mm diameter HYS bars.*

Conditions attached to the storage facility pertain to fire safety, colour of external finish of building and that surface water from the development was to be discharged into soak pits on the Application Site and not allowed to flow to the public road in the interest of traffic safety.

4.5.5.7 10/20kV ESB Substation

Permission was granted in 2005 for a 10/20kV substation to serve Ballivor Works (Reference 05/2348). The total floor area of the development measures 23.15m^2 with a plaster finish to all external walls. No tree removal was required for its construction. The stated drainage method is roof water to open drain. No water supply or wastewater management is required. Conditions attached to the planning

permission pertain to ensuring the development is constructed in accordance with ESB standards and as per the plans and particulars submitted. Please see Chapter 14 Material Assets for details.

4.5.6 Non-Peat Related Activities

4.5.6.1 Commercial Forestry Activities

Bord na Móna landholdings at the Application Site include approx. 10ha of conifer forestry (approx. 8.76ha in Lisclogher-West Bog and 1.78ha in Ballivor Bog) that is managed exclusively by Coillte. These pockets do not fall within the peat extraction bogs and do not form part of the Substitute Consent application but will form part of the cumulative assessment within the following impact assessment chapters rEIAR.

4.5.6.2 Model Aircraft grass take-off and landing strip

The application for, and subsequent operation of two intersecting grass strips for the take-off and landing of model aircraft was undertaken by a third party at Lisclogher West, under lease agreement of the site with Bord na Móna. No intrusive ground works or connection to services were/are required to establish or operate this hobbyist activity at the site.

4.5.6.3 Wind Monitoring Mast

The Applicant was granted a five-year permission for a 100-metre-tall guyed meteorological wind mast to be erected at Lisclogher Bog in 2016 (Westmeath Planning Reference 156135; 166259) for the purposes of assessing the site for potential future wind energy development. A three-year retention permission for the mast was granted by Westmeath County Council in January of 2022 (Planning Reference 21620). Further details on this can be found in Section 4.10.1.

4.6 Control Measures July 1988 to June 2000

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

4.6.1 Archaeological Code of Practice

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

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

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

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

A Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna was established in 2012.[9] This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable Bord na Móna to progress with peat extraction activities and all ancillary works and simultaneously ensure archaeological control measures are in place. The measures Bord na Móna are responsible for are listed below:

Bord na Móna will:

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

[8] *Department of the Arts, Heritage and the Gaeltacht 2013 Review of Archaeological Survey and Mitigation Policy relating to Bord na Móna Peatlands since 1990. https://www.archaeology.ie/sites/default/files/media/pdf/bnm-peatland-review-final-report-20-06-2013.pdf*
[9] *2012 Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Mónahttps://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf*

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

4.7.1.1 Environmental Monitoring and Conditions under IPC Licence

Bord na Móna were granted an IPC Licence (P0501-01) for the Derrygreenagh Bog Group (which encompasses the Ballivor Bog Group, and therefore the Application Site) in April 2000. Following this grant, the control measures listed in Section 4.6 above have been updated and expanded. The background to the IPC application and implementation at the Ballivor Bog group can be found in Chapter 2 Background and a copy of the licence is provided in Appendix 4-1. The licence application is publicly available and can be viewed on request at EPA headquarters PO Box 3000 Johnstown Castle Estate County Wexford Y35 W821. The EPA licencing inspectors' reports can be viewed at the following webpage: https://epawebapp.epa.ie/terminalfour/ippc/ippc-view-filter.jsp?regno=P0501-01&filter=c&docfilter=go

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

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

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

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

> *(a) any emissions from the activity will not result in the contravention of any relevant air quality standard specified under section 50 of the Air Pollution Act, 1987, and will comply with any relevant emission limit value specified under section 51 of the Air Pollution Act, 1987,*
>
> *(b) any emissions from the activity will comply with, or will not result in the contravention of, any relevant quality standard for waters, trade effluents and sewage effluents and standards in relation to treatment of such effluents prescribed under section 26 of the Local Government (Water Pollution) Act, 1977,*
>
> *(c) any emissions from the activity or any premises, plant, methods, processes, operating procedures or other factors which affect such emissions will comply with, or will not result in the contravention of, any relevant standard including any standard for an environmental*

medium prescribed under regulations made under the European Communities Act, 1972, or under any other enactment,

(d) any noise from the activity will comply with, or will not result in the contravention of, any regulations under section 106,

(e) any emissions from the activity will not cause significant environmental pollution, and

(f) the best available technology not entailing excessive costs will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity,

and, where appropriate, the Agency shall attach conditions relating to the matters specified in the foregoing paragraphs to the licence or revised licence.

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

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

In compliance with Condition 5, the Applicant must undertake annual tests on boiler combustion efficiency and dust monitoring. Please see Chapter 9 Air Quality for further details. Condition 6 ensures the Applicant establishes a surface water discharge monitoring programme which is reviewed annually and a report submitted to the EPA quarterly. The Applicant is also required to submit water sample results annually, implement and maintain silt ponds. Condition 9 pertains to the 'Water Protection' and outlines the daily, weekly, monthly, quarterly, and annual inspections Bord na Móna must carry out to provide for the protection of surface and groundwater. There are currently silt pond inspections and maintenance including quarterly grab sampling ongoing at the application site. Please see Chapter 8 Hydrology and Hydrogeology for further details. Condition 7 compels the Applicant to correctly dispose of waste to licenced facilities. Please see Chapter 14 Material Assets for details. Condition 8 ensures that any on site activities do not give rise to noise exceedances at noise sensitive locations. Please see Chapter 11 Noise and Vibration for further details. Condition 10 pertains to site decommissioning followed by peatland rehabilitation and is detailed in Section 4.9 below which details the Remedial Phase, and Chapter 6 Biodiversity. It is the intention of the of the Applicant to continue implementing and practising the mitigation and monitoring measures as listed in the Licence after the site is decommissioned, where applicable.

4.7.2 Standard Operation Procedures

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

4.8 Current Phase - June 2020 to Present Day

4.8.1 Decommissioning Process

In January 2021, Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction had ceased at the Application Site prior to this in June 2020. The Application Site still operates under the requirements of IPC Licence 0501-01, and any decommissioning works undertaken with respect to peat extraction activities and all ancillary works are in accordance with Condition 10 of the IPC Licence, which states that that:

> '***10.1*** *following termination of use or involvement of all or part of the site in the licenced activity, the licensee shall:*
>
> > ***10.1.1*** *Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*

In compliance with Condition 10.1 of the IPC Licence, it is a requirement to decommission the Application Site by removing/disposing/recovering buildings, equipment, waste etc from the Application Site. The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under Section 95 of the EPA Act. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the Application Site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stockpile covering, pumps, septic tanks and fuel tanks. To date, the only decommissioning underway at the Application Site was the removal of remaining peat stockpiles from the bogs. This was completed by the end of 2023. Infrastructure to be decommissioned at the Application Site is listed in Table 4-9 below. It should be noted that no extant buildings will be demolished as part of the decommissioning programme. The decommissioning programme and activities are detailed in the Cutaway Bog and Decommissioning and Rehabilitation Plan for each bog which can be found in Appendix 4-2.

From mid-2020 to mid-2021 the operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

Table 4-9 Infrastructure Decommissioning List for each bog

Item	Description	Application Site Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Relevant to Ballivor, Bracklin and Carranstown
2	Clean silt ponds	All bogs
3	Decommission peat stockpiles	Complete
4	Decommission or remove buildings and compounds	N/A
5	Decommission fuel tanks and associated facilities	Relevant to Ballivor
6	Decommission and removal of septic tanks	Relevant to Ballivor
7	Decommissioning and removal of Bog pumps	Completed at Lisclogher post cessation of extraction. Not relevant at other bogs

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

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

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

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

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

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

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

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

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

4.8.2 Peatland Climate Action Scheme

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures with the primary aim of optimising climate action benefits of rewetting former industrial peat extraction areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. These measures are separate to those defined by the IPC Licence. This programme has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions. In addition, this will also benefit biodiversity and water (water quality and catchment management), as well as providing space for local communities and people to enjoy the outdoors. The scheme is supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC). Please see https://www.bnmpcas.ie/ for details. The National Parks and Wildlife Service (NPWS) acts as the Scheme regulator and there is ongoing engagement with the EPA. This scheme is in addition to the IPC licence requirements and therefore does not form part of this Substitute Consent application and is being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures e.g., bogs such as Carranstown East, Lisclogher West and Bracklin West where PCAS is currently underway.

The scope of proposed rehabilitation measures for the three bogs that are currently active under the PCAS programme include the following, which is directly taken from Section 8 of each relevant Bog report included in Appendix 4-2 Cutaway Bog and Decommissioning and Rehabilitation Plan:

Carranstown East:

- *Deep Peat measures including field re-profiling, bunding and drain-blocking, resulting in bunded wetlands suitable for Sphagnum inoculation, on deeper peat;*
- *Intensive drain blocking around shallow peat areas / modelled depressions on little or no peat to create/promote the spread of wetland habitats,*
- *Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;*
- *Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels;*
- *Intensive drain blocking (7/100) in areas to develop wetlands in areas of shallow peat.*
- *Measures include the blocking of outfalls, management of water levels and transplanting reeds and other rhizomes;*
- *Berms and field re-profiling (45m x 60m cell) in deep peat areas, along with blocking outfalls and managing overflows with a controlled weir outfall, includes drainage channels for excess water and Sphagnum inoculation;*
- *Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.*
- *Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.*

Lisclogher West

- *Raised bog restoration measures including intensive drain-blocking (7/100 m);*
- *Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;*
- *Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels;*
- *Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;*
- *Removal of conifer forestry from the high bog (Forest to Bog restoration). A small part of the high bog was planted with conifer forestry. It is proposed to remove this forestry to support raised bog restoration.*
- *Trees will be felled and removed, conifer stumps will be "flipped", the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. This requires engagement and agreement with Coillte and with the Forest Service. This enhanced bog restoration measure is proposed to be carried out as a trial at Lisclogher West to learn new techniques and to inform the feasibility and potential to use these new techniques at other sites to remove conifers (See Appendix XIV).*
- *Removal of feral self-sown conifer trees from the high bog (TCT1). Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration.*
- *Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and Bord na Móna Lisclogher West Draft Decommissioning and Rehabilitation Plan 2023 maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).*

Bracklin West:

- *A widespread drain-blocking programme will be implemented across the cutaway bog, where possible.*
- *In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.*
- *In areas of deeper peat, berms and field reprofiling will be carried out to create 45m x 60m cells. These will be carried out in deep peat areas where water has potential to be retained within the cell. Measures will also entail blocking outfalls, managing overflows, creating drainage channels for excess water and carrying out Sphagnum inoculation.*
- *Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.*
- *Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes;*
- *Wetland measures including drain blocking, blocking outfalls and managing water levels with overflow pipes.*

4.9 Remedial Phase

4.9.1 Peatland Rehabilitation Plans

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

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

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

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

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

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

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

Bord na Móna have produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site, and it is the intention of Bord na Móna to rehabilitate the bogs in a phased approach under IPC Licence. Please see Appendix 4-2 for details. The rehabilitation plans were developed from a combination of the following:

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

- Hydrological modelling.

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

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

Prior to the finalisation of and submission of the rehabilitation plans to the EPA, a baseline ecology survey will be carried out to determine the status of natural colonisation, the potential for targeted revegetation and/or rewetting and the future development at the Application Site to ensure stabilisation of the future cutaway. Draft rehabilitation plans for each bog which outline the proposed rehabilitation for the Application Site have been prepared and are detailed below. Table 4-10 outlines a high-level overview of the actions proposed for each bog and Table 4-11 gives a programme overview of when these works will be undertaken. Further details can be found in the draft plans in Appendix 4-2.

Table 4-10 Types of and areas for rehabilitation measures at Bog Group. Note that the types of rehabilitation and specific areas of rehabilitation may vary in response to stakeholder consultation and refinement of the rehabilitation measures.

Bog	Type*	Description	Area (Ha)
Lisclogher	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) and blocking outfalls and managing water levels with overflow pipes	305.7
	Dry Cutaway	Blocking outfalls and managing water levels with overflow pipes	148.7
	Marginal Land	No Work Required	65.5
	Other	Silt Ponds	0.36
Carranstown	Deep peat	More intensive drain blocking (max 7/100), blocking outfalls and Sphagnum inoculation. Berms and field re-profiling (45x60m cell), blocking outfalls and managing overflows & drainage channels for excess water & Sphagnum Inoculation	159.72
	Dry Cutaway 2	Regular drain blocking (3/100m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	17.57

Bog	Type*	Description	Area (Ha)
	Wetland	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	4.28
	Marginal Land	No Work Required	34.55
	Other	Silt Ponds, Other Constraints (ROW)	90.12
Lisclogher West	Deep peat	More intensive drain blocking (max 7/100), modifying outfalls Berms and field re-profiling (45m X 60m cell), modifying outfalls and managing overflows, drainage channels for excess water, Sphagnum inoculation	124.71
	Additional Works	Targeted Drain Blocking, where possible	29.06
	Conifer removal	Removal of self-seeded feral conifers from high bog. Fell to waste. This overlaps with the deep peat (intensive drain blocking) footprint	119.24**
	Forest to bog	Agreement with Coillte and Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking	6.98
	Marginal Land	No Work Required	47.54
	Other	Silt ponds, constrained areas	30.11
Ballivor	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) and blocking outfalls and managing water levels with overflow pipes	398
	Dry Cutaway	Blocking outfalls and managing water levels with overflow pipes	39
	Marginal Land	No Work Required	65
	Other	Silt ponds, constrained areas	143
Bracklin	Deep Peat Cutover Bog	Regular drain blocking (3/100 m) and blocking outfalls and managing water levels with overflow pipes	223
	Dry Cutaway	Modifying outfalls and managing water levels with overflow pipes	116
	Wetland	Modifying outfalls and managing water levels with overflow pipes	5

Bog	Type*	Description	Area (Ha)
	Marginal Land	No Work Required	171

*Note that the types of rehabilitation and areas of rehabilitation may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures

**Note that this is not an additional area. This area overlaps the deep peat footprint (More intensive drain blocking (max 7/100), modifying outfalls) footprint. Targeted conifer removal will take place in this area.

Table 4-11 Application Site Rehabilitation Programme. Please see Appendix 4-2 for more details.

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
Lisclogher (referred to as Lisclogher East in respective Rehabilitation Plan), Ballivor, Bracklin (referred to as Bracklin and Bracklin West in respective Rehabilitation Plans)	Significant areas of the site have already re-vegetated, with pioneer vegetation maturing and developing a mosaic of typical cutaway peatland habitats with Birch woodland predominating. Bare peat areas within the older cutaway areas are reducing. Natural re-colonisation of the cutaway areas so far has been quite effective. Other parts of the site (younger cutaway) are naturally colonising for more than 10 years and are developing a mosaic of cutaway habitats. An area of marginal raised bog remnant (19 ha) was restored at Bracklin Bog in 2016, as part of the Bord na Móna Raised Bog Restoration Programme	Seek formal approval of the decommissioning and rehabilitation plans from the EPA. Develop a detailed site plan outlining how the various rehabilitation methodologies will be applied to the bogs. This will take account of peat depths, topography, drainage and hydrological modelling. A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out at Bracklin Bog. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. A review of remaining peat stock to be carried out at Ballivor Bog. An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of	Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. Carry out the proposed monitoring, as outlined. Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase. Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway around and between the proposed windfarm infrastructure. All rehabilitation will be carried out with regard to best practice environmental control measures. (See Plans Appendix III for details).	Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary. Decommissioning of silt-ponds will be assessed and carried out, where required. Reporting to the EPA will continue until the IPC License is surrendered. Delivery of a monitoring, aftercare and maintenance programme

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
		sensitive ground-nesting bird breeding species (e.g., breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site. Ensure all activities comply with the environmental protection requirements of the IPC Licence. Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures and other environmental control measures during the implantation of the rehabilitation plan.		
Carranstown	N/A	Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme does not materialise, from the EPA. Agree an *ex-ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator. Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (PCAS measures) will be applied to Carranstown Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an	Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures. Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. Carry out the proposed monitoring, as outlined.	Evaluate success of short-term rehabilitation measures undertaken to date and remediate where necessary. Delivery of a monitoring, aftercare and maintenance programme Decommissioning of silt-ponds will be assessed and carried out, where required. Reporting to the EPA will continue until the IPC License is surrendered

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
		indicative view of the application of different rehabilitation methodologies). A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. There is some known turbary on this bog A review of remaining milled peat stocks has been carried out. Remaining peat stocks on the bog will be removed prior to rehabilitation. An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required. An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the	While natural colonisation is expected to have commenced as soon as extraction ceased in 2020, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*. Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase. Submit an *ex-post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex-ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme.	

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
		rehabilitation plan for Carranstown Bog screened out at the Stage I.) Ensure all activities comply with the environmental protection requirements of the IPC Licence. Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures and other environmental control measures during the implantation of the rehabilitation plan.		
Lisclogher-West	N/A As Lisclogher West was never brought into peat production, rehabilitation measures have not been necessary at this bog to date.	Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme does not materialise, from the EPA. Agree an *ex-ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator. Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (PCAS measures) will be applied to Lisclogher West Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies). A drainage management assessment of the proposed enhanced rehabilitation measures will	Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (See Appendix IV of Plan). Carry out actions to remove conifer forestry from the high bog, including tree-felling, removal of biomass (where possible), stump-flipping, surface smoothing and drain-blocking Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. Carry out the proposed monitoring, as outlined. Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids	Evaluate success of short-term rehabilitation measures undertaken to date and remediate where necessary. Delivery of a monitoring, aftercare and maintenance programme Decommissioning of silt-ponds will be assessed and carried out, where required. Reporting to the EPA will continue until the IPC License is surrendered

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
		be carried out and any issues identified resolved and the rehabilitation plan adapted. A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. Ensure all activities comply with the environmental protection requirements of the IPC Licence. Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan. Carry out Appropriate Assessment (AA) of the Rehabilitation Plan.	run-off from the site during the rehabilitation phase. Submit an *ex-post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex-ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme.	

Bog	Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
		Engage with Coillte and the Forest Service regarding the feasibility of removing conifer plantations from the high bog at Lisclogher West.		

4.9.1.1 Description of Proposed Rehabilitation Measures

Some rehabilitation works have commenced on the Application Site already as described in the Cutaway Bog and Decommissioning and Rehabilitation Plans (Appendix 4-2) and in Table 4-11 above. Further rehabilitation work will commence immediately following the decommissioning of the Application Site. The Cutaway Bog and Decommissioning and Rehabilitation Plans included provides a description of the five bogs and their ecology. It also provides a framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the plan will be implemented.

The details necessary to achieve the aims set out in the Cutaway Bog and Decommissioning and Rehabilitation Plans (and shown on the potential Future Habitats map) will include the exact locations of the drains to be blocked and bunds to be constructed etc. These details are based on the existing habitats present and the topography of the Application Site. This level of detail will only be available and will be included in the final rehabilitation plan once the Application Site has been fully decommissioned which is estimated to be 2024. The remedial measures to be undertaken will follow proven and standard procedures that have been successfully applied by Bord na Móna and known to be effective as detailed below.

Drain Blocking

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

- Peat dams within small drainage channels on the cutover bog;
- Trench blocking using plastic sheet piles on larger drains (see Plate 4-38); and
- Removal or blocking of drainage pipes where required.

These methods are fully described in the Irish Wildlife Manual *'Best Practice in raised bog restoration in Ireland'* (Mackin et al, 2017). Plate 4-38 below shows a partially blocked drain, with level of blocking determined by driving plastic piles in the centre of the drain further into the peat (Source: NPWS, 2017). Such measures will ensure a rise in the water table while not creating open waterbodies.



Plate 4-38 Partially blocked drain, with level of blocking determined by driving plastic piles in the centre of the drain further into the peat (Source: NPWS, 2017). Such measures will ensure a rise in the water table while not creating open waterbodies.

Cell Bunding

Another option to re-wet cutaway bog and maintain suitable hydrology to encourage the establishment of vegetation is cell-bunding. This technique has been trialled on several peatland restoration LIFE projects in the UK to maintain wetness on peat with minor slopes (Anon, 2016). Bord na Móna used this technique during the Oweninny rehabilitation programme (Bord na Móna 2002, Farrell and Doyle, 2003) and it has also been recently trialled at Lodge Bog and at Longfordpass Bog. The Bord na Móna experience at Oweninny found that this technique worked best where ground was relatively flat and where water-levels were already close to the bog surface. Such conditions occur within the proposed rewetting areas at Ballivor as identified in the Future Habitats map within the Cutaway Bog and Decommissioning and Rehabilitation Plans.

As part of the Ballivor Bog Group peatland rehabilitation, Bord na Móna will carry out a cell-bunding trial at Bracklin West, Carranstown and Lisclogher West. Cell-bunding will be carried out in selected areas that have potential to re-establish water levels at the bog surface, as well as in somewhat drier areas where Heather has become established. The objective here utilising this technique will enhance the re-wetting of drier peat more quickly than drain-blocking on its own. The methodology will follow techniques used by Natural England (Anon, 2016)[10] which are listed below.

Re-wetting consisted of constructing bunded cells (20 x 10 m to 30 x 30 m), by:

a) Digging a trench through the degraded surface layer of peat (around 20-50cm deep). Any cracks along the line of the trench are 'squished' shut using the surrounding undried, undamaged 'plastic' undried peat. All tree roots are dug out along the line of the trench;
b) Filling the trench with good 'plastic' peat (from an adjacent 'borrow pit') to ground level, and then raised by another 10 cm above ground;

[10] *Nature England 2016 Bog Life: Bringing Lowland Raised Bogs to Life. Available at: https://www.humberheadpeatlands.org.uk/wp-content/uploads/2016/07/BogLIFE-newsletter-Issue2-May-2016.pdf*

c) Linking bunds together to create four-sided cells to hold water within the bunds, keeping the water table at the surface. The size and shape of cells depends on slope and terrain. The steeper the slope the longer and thinner the cells become; and
d) Covering bunds with turf or brash to prevent them from drying out.

The application of this technique is innovative and positive in the context of applying new techniques and methodology to re-wet bog and develop peat-forming conditions. The locations where this cell bunding trial will be undertaken will be determined following the initial drain blocking exercises and will be overseen by Bord na Móna ecologists.

Monitoring

Prior to the commencement of drain blocking works, permanent vegetation monitoring plots will be established along transects within the rewetted areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the Application Site. Monitoring plots will be surveyed and classified using the relevé method as per the National Survey of Upland Habitats with plot sizes being 2m x 2m. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GIS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified during the baseline survey which will be carried once the site has been fully decommissioned. However, it is envisaged that a minimum of fifteen 2m x 2m monitoring plots will be established in the enhanced area. Monitoring plots will be surveyed once annually during the first five years and at 5-year intervals.

Results will be analysed by Bord na Móna and a report of the findings will be produced. The rehabilitation plan will be regularly reviewed and amended if necessary, during its implementation to improve the efficacy of the enhancement work. The number of monitoring plots may change depending on the results of the initial surveys.

The monitoring survey design will take into consideration the following:

- Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition (Kent, 2011);
- Detailed habitat and ecotype classification based on The National Survey of Upland Habitats (Perrin et al., 2014);
- A Manual for the Production of Grazing Impact Assessments in Upland and Peatland Habitats (NPWS and DAFM, 1999);
- Blanket Bog, Heath and Upland Grassland Exclosures, Baseline Surveys and Monitoring Methodologies (Dunne, 2000);
- Peatland Restoration (Lunt et al. 2010); and
- Revegetation of Areas that Cannot be Rewetted

In areas that cannot be re-wetted, i.e., areas that are higher due to the nature of the peat extraction process, underlying geology and identified in the rehabilitation plans, these areas will be revegetated using the following two management options:

1. *The establishment of grassland habitat through a formalised management regime and mowing.*
2. *Encourage the establishment of birch dominated scrub through the use of fertiliser where mowing is not practical.*

Grassland Establishment

In higher areas where rewetting measures will not result in sufficient elevation in the local water table to promote natural revegetation, it may be more advantageous to speed up re-vegetation with the use of fertilisers, lime and nursery crops [sheeps fescue (*Festuca ovina*), red fescue (*Festuca rubra*) or bent species (Agrostis spp.)] to speed-up natural colonisation. The use of a one-off fertiliser treatment can be very effective in enhancing natural colonisation as one of the key limiting factors is poor nutrient status, particularly the lack of Phosphorus (Renou-Wilson 2008). Seed sources are generally not a constraint once fertiliser is applied. Trials by the Bord na Móna Ecology Team have found that the use of green hay on bare peat can also be an effective aid to natural colonisation (Kilmacshane green hay trial).

At the Application Site, the drier raised areas of milled peat will be enhanced for pollinating insects as part of the environmental stabilisation. Re-vegetation will be facilitated through the establishment of semi-natural grassland using a wildflower pollinator-friendly seed mix and/or by using 'Green Hay' in combination with fertiliser and/or lime and a nursery crop.

The species mix will comprise of a variety of plant species that will grow on peatland habitats found in the Application Site and contribute to an enhancement in biodiversity. The use of wildflower/native species that are also locally common will be incorporated into the seed mixes. The management of the habitat in these areas in this way will be beneficial for other wildlife, particularly pollinators (bees, butterflies and other invertebrates) by providing more wildflowers, food and space. Such measures will also tie in with the objectives of the Lepidoptera Management Plan for the enhancement and creation of marsh fritillary supporting habitat.

Where conditions allow, sensitive wildflower meadow management will be employed along some of the new verges that will be created along access tracks. A combination of a suitable wildflower seed mix and a sensitive mowing regime could be used to manage portions of the site verges as pollinator friendly verges.

A similar approach has been used before by Bord na Móna at Lough Boora Discovery Park carpark, using a bespoke wildflower seed mix during the landscaping of the former cutaway bog site. The landscaped areas within the carpark have now stablished to a sward dominated by ox-eye daisy. A bespoke seed mix was used for the carpark landscaping. The seed mix was developed in consideration of the specific environment of the landscaping area. This was relatively dry, with shallow fen peat and significant sub-soil influence meaning a relatively higher pH. This type of environment was suitable for the development of a calcareous grassland type seed mix (which would be suitable in some areas within Ballivor).

The management undertaken will vary across the Application Site and will be tailored to the requirements of the varying habitats and the specific on-site environment where there will be a variety of peat depths, hydrological conditions and nutrient status. Management (e.g., mowing) will not be uniform. Where mowing is possible (and required to prevent the establishment of scrub on these grassland areas), nonannual (e.g., 3-5 year) mowing cycle will be implemented. This will ensure a suitably diverse sward is maintained as well as avoiding significant disturbance to invertebrate lifecycles. Different actions in different places will enhance the natural diversity of habitats already developing on site.

Bord na Móna will oversee the design, implementation and monitoring of the reseeding and stabilisation works following the installation of the development footprint. The management of these areas will be monitored along with the monitoring of the rewetting and habitat enhancement annually for the first five years and on a five yearly basis thereafter.

Establishment of Birch Dominated Scrub

The establishment of birch dominated scrub using fertiliser, as described above, where mowing is not practical will speed up the revegetation of these drier areas within the Application Site. Such promotion of the establishment of scrub within the Application Site will result in the formation of a mosaic of habitats while also ensuring that extensive areas of open water do not form.

4.10 Potential Future Land Use

4.10.1 Proposed Ballivor Wind Farm

The Ballivor Bog Group, and in particular therein, 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 Climate Change Advisory Council's Annual Review 2024. 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 Ballivor Bog Group and in particular therein, the Application Site, for both peatland rehabilitation and wind energy infrastructure, and to facilitate environmental stabilisation of the bog group and the optimisation of climate action benefits.

In April 2023, Bord na Móna Powergen Ltd lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarm.ie/). The proposed wind farm is located on Ballivor bog, Carranstown bog, Bracklin bog, Lisclogher bog and agricultural land adjacent to Bracklin bog. This application was made directly to An Bord Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Planning and Development Act 2000, as amended (the Act). This position was confirmed by An Bord Pleanála in correspondence to the Applicant dated 5th April 2022 following pre-application consultations with the Board under Section 37B of the Act (ABP-307471-20). A separate EIAR and accompanying NIS was undertaken for the proposed wind farm development. At the time of writing, a decision has not yet been made by An Bord Pleanála with regards this application.

The overall permanent footprint of the proposed wind farm will be less than 1.4% of the total area of the Bog Group, or approx. 1.8% of the Wind Farm 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 wind farm infrastructure. The EIAR for the proposed Ballivor 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, then other measures such as re-seeding would be considered.

The draft Rehabilitation Plans which accompany the wind farm application detail how the Bog Group will be rehabilitated along with the construction and operation of the proposed wind farm; on the assumption the wind farm will be granted. Further details of this proposed wind farm development can be obtained at the project website (https://www.ballivorwindfarm.ie/). As mentioned, the wind farm footprint comprises less than 1.8% 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 by a factor of 115 and facilitates the undertaking of a robust environmental assessment.

Both the remedial measures and the proposed Ballivor Wind Farm (Planning Reference 316212) are cumulatively assessed with the future remedial measures that will be carried at the Application Site.

4.10.2 Ongoing and Future Enhanced Rehabilitation Measures (PCAS)

As discussed in Section 4.8 part of Condition 10 of the IPC Licence (P0501-01), decommissioning and rehabilitation will be carried out as standard remedial measures associated with peat extraction activities and all ancillary works at the Application Site. In line with Bord na Móna's accelerated decarbonisation strategy, and the availability of government funding, the company has also committed to ambitious enhanced peatland decommissioning, rehabilitation and restoration measures, targeting circa 33,000 ha in over 80 no. Bord na Móna bogs.

This strategy has been developed to optimise ecosystem service benefits of peatland rehabilitation and restoration, particularly carbon storage and reducing carbon emissions. In addition, this will also benefit biodiversity and water (water quality and catchment management), as well as providing space for local communities and people to enjoy the outdoors.

In the event that future PCAS plans are not implemented or prepared, the Application Site will be rehabilitated in line with the rehabilitation plans outlined in Section 4.8 and Section 4.9 above and included in Appendix 4-2.

Both the enhanced rehabilitation measures (PCAS) and the proposed wind farm are cumulatively assessed in this rEIAR with the future remedial measures (described in Section 4.8, 4.9 and Section 4.10 above) that will be carried out at the Application Site a part of the IPC Licence requirements under Condition 10 of the Licence.

5. POPULATION & HUMAN HEALTH

5.1 Introduction

5.1.1 Background & Objectives

As reported in Chapter 4, the assessments in this rEIAR address the environmental impacts of peat extraction activities and all ancillary works occurring at the Application Site. The assessments in this chapter will determine the any likely significant effects that occurred on population and human health (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 June of 2020 (July 1988 – June 2020). The Peat Extraction Phase is described in detail in Sections 4.4 to Section 4.7 in Chapter 4.
- **Current Phase**: the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in Section 4.8 of Chapter 4.
- **Remedial Phase**: the activities intended to be carried out at the Application Site into the future. The Remedial Phase is described in detail in Section 4.9 of Chapter 4.

The assessment on population considers the current and historical land use of the Application Site, the current activities occurring within and in the vicinity of the Application Site, and their impacts, if any, on local population and employment. The assessment on human health includes literature review of health impact assessment and the EIA process and a review of the past, current and future activities on air quality, dust, noxious emissions, water quality, traffic and transport and general health and safety.

Further discussion on environmental impacts are addressed in more detail in the following chapters: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, Chapter 10 Climate, Chapter 11 Noise, Chapter 12 Landscape and Visual, Chapter 13 Cultural Heritage, Chapter 14 Material Assets (including Traffic and Transport) and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

5.1.2 Statement of Authority

This section of the rEIAR has been prepared by Karen Mulryan, Ellen Costello and Natalia Stolarska and reviewed by Sean Creedon, all of MKO. Karen is an Environmental Scientist with MKO with over 7 years' experience in the private consultancy sector. Karen holds a BA and a MSc in archaeology. Karen has a wide range of experience in the commercial sector including watching briefs, surveys and desk-based assessments for a wide range of projects including wind farms, solar farms, energy storage facilities, grid routes, mixed use and residential developments. Karen coordinates environmental assessments and site work for a wide range of developments such as solar, residential, energy storage, small wind projects. Karen has experience coordinating and managing Environmental Impact Assessment Reports, feasibility studies and screening reports. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment. Natalia Stolarska is a Graduate Environmental Scientist with MKO. Natalia holds a BSc in Earth and Ocean Science and an MSc in Environmental Leadership. Natalia's key strengths and areas

of expertise are in drafting EIAR report chapters, environmental impact assessment screening reports, wind farm feasibility studies and QGIS mapping. Since joining MKO in September 2023, Natalia has been involved as a Graduate Environmental Scientist in a range of wind farm projects, assisting with field work, client briefing notes, constraints mapping and drafting EIAR chapters, with more projects in the pipeline.

Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

5.2 Methodology

As per Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU:

> *"1. The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
>
> *(a)* ***population and human health****;*
> *(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
> *(c) land, soil, water, air and climate;*
> *(d) material assets, cultural heritage and the landscape;*
> *(e) the interaction between the factors referred to in points (a) to (d).*
>
> *2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned."*

A publication by the European Commission (EC), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017), outlined that:

> *"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

This chapter will follow this EC guidance and will examine the health effects relevant to the Project as they relate to a relevant, defined study area. The effects of the Project on the population and human health are assessed in compliance with the requirements of the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

The study area for this assessment is defined as the Electoral Divisions (ED) within which the Application Site is located, namely Ballyhealy (CSO ED code 237011), Copperalley (CSO ED code 237034), Cloghbrack (CSO ED code 167019), Killaconnigan (CSO ED code 167046), Killyon (CSO ED code 167051), Riverdale (CSO ED code 237091), Ballynaskeagh (CSO ED code 237015) and Bracklin (CSO ED code 237019) (hereafter referred to as 'Study Area') The assessment also refers to county and national statistics. The term 'District Electoral Division' was changed to 'Electoral Division' by Section 23 of the Local Government Act, 1994 with effect from 24 June 1996 (S.I. 196 of 1996 refers) [1]. The EDs which define the Study Area are the same District Electoral Divisions which define the Study Area prior to taking effect of S.I. 196 of 1996.

The EPA 2022 EIAR Guidelines advise that "*in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g., under the environmental factors of air, water, soil etc.*" Environmental impacts which have arisen from historic peat extraction activities and all ancillary works which may also have an impact on population and human health are discussed in this chapter and addressed in further detail in the following chapters as appropriate: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, Chapter 10 Climate, Chapter 11 Noise and Vibration, Chapter 12 Landscape and Visual, Chapter 13 Cultural Heritage, Chapter 14 Material Assets (including Traffic and Transport), and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

A desk-based assessment using sources referenced in Section 5.2.1 below was undertaken to examine relevant information pertaining to the assessment of the potential for any likely significant effects on population and human health. The effects of peat extraction activities and all ancillary works on the human environment are assessed in compliance with the EIAR Guidelines as outlined in Chapter 1 (Introduction).

As discussed in Chapter 1, neither the EIA Directive nor the Habitats Directive has retrospective effect. There was, therefore, no legal requirement for EIA, screening for EIA or Appropriate Assessment in respect of any project prior to the latest dates for transposition of the Directives. In the case of the EIA Directive, the required date for transposition was 3rd July 1988. In the case of the Habitats Directive, the required date for transposition was 10th June 1994. Owing to being the earliest transposition date, and in light of the non-retrospective effect of the Directives, the assessment period of the potential for any likely significant effects on human health and population commences as of July 1988.

To inform the desk-based assessment, OSI mapping, including historical 6" (mapped years 1829-1841[2]) and 25" (mapped years 1897-1913) maps, were reviewed, as well as available aerial photography of the site. Information on population statistics, employment and social data for the relevant EDs were obtained from the Central Statistics Office (CSO) for census years 2022, 2016, 2011,2006, 2002, 1996, 1991 and 1986. While a census was not completed in the baseline assessment year of 1988, it is considered that census data for 1986 is representative of the baseline environment in 1988. Fáilte Ireland's *EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects* was also considered in this assessment.

5.2.1 Relevant Guidelines

As referenced in the Department of Housing, Planning and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanála*, (taken from the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment

[1] *Census 2022 Small Area Population Statistics https://www.cso.ie/en/census/census2022/census2022smallareapopulationstatistics/#:~:text=For%20Census%202022%2C%20the%20CSO,data%20for%203%2C420%20Electoral%20Divisions.&text=The%20term%20District%20Electoral%20Division,196%20of%201996%20refers).*

[2] https://www.tailte.ie/en/surveying/products/professional-mapping/historical-maps-and-data/

Report (2017)), human health is, "*a very broad factor that would be highly project dependent.*" The report continues:

> *'*The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population.'*

Environmental Protection Agency EIAR Guidelines

In 2022 the Environmental Protect Agency published EIAR Guidelines (the Guidelines) which state that "*while no specific guidance on the meaning of the term Human Health has been issued in the context of Directive 2014/52/EU, the same term was used in 3.3.6 the SEA Directive (2001/42/EC). The Commission's SEA Implementation Guidance states 'The notion of human health should be considered in the context of the other issues mentioned in paragraph (f)'*" of the Directive, environmental factors such as soils, water, landscape, air etc. The Guidelines state that this approach is '*consistent with the approach set out in the 2002 EPA Guidelines where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil*'. The Guidelines note that the above approach follows the 2002 EPA guidelines already in place which details the following:

"*The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment".*

The 2022 EPA Guidelines state that "*assessment of other health & safety issues are carried out under other EU Directives, as relevant. These may include reports prepared under the Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment, Seveso III, Water Framework Directive, Floods or Nuclear Safety Directives48. In keeping with the requirement of the amended Directive, an EIAR should take account of the results of such assessments without duplicating them*". This rEIAR is accompanied by Annual Environmental Reports (AER) prepared by the Bord na Móna (the Applicant) and submitted to the EPA in compliance with Integrated Pollution Control (IPC) licence requirements. Please see Appendix 4-3 for the most up to date 2023 AER.

IEMA Guidance 2017

The Institute for Environmental Management and Assessment (IEMA) published 'Health In Environmental Impact Assessment: A Primer for a Proportionate Assessment' in 2017 examining what a proportionate assessment of the impacts on health should be in Environmental Impact Assessments. The document. The document states that Health Impact Assessment (HIA) and EIA are separate processes.

> '*HIA is defined as a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, programme or project on both the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects... [...] ... HIA can inform EIA practice in relation to population and human health but conducting a HIA will not necessarily meet the*

EIA population and human health requirement. By the same token, conducting an EIA will not automatically meet the requirements of a HIA.'

The Primer Assessment Report acknowledges that 'disproportionate burdens maybe placed on developers if HIA is applied as a proxy for the consideration of population and human health in every future UK EIA'. The focus of EIA should be on predicting health and wellbeing outcomes, rather than focusing on changes in determinants of health e.g., expected changes in noise levels. *Determining the significance of impacts on* population and human health should include a professional judgement, scientific literature; consultation responses; comparison with baseline conditions; local health priorities; and national/international regulatory standards and guidelines. The primer report refers to the WHO 2014 which provides and overview of health in different types of assessment:

"*The health sector, by crafting and promoting HIA, can be regarded as contributing to fragmentation among impact assessments. Health issues can, and need to, be included [in impact assessment] irrespective of levels of integration. At the same time, from a civic society perspective, it would be unacceptable for HIA to weaken other impact assessments. A prudent attitude suggests optimizing the coverage of health along all three avenues:*

- *Better consideration of health in existing impact assessments other than HIA;*
- *Dedicated HIA; and*
- *Integrated forms of impact assessment."*

As such, the WHO does not support a stand-alone HIA unless it could be demonstrated to be of advantage over an EIAR. Therefore, given that this human health assessment is part of the EIAR; there is no stand-alone HIA.

EIA Significance Matrix for Human Health, IEMA Guidance 2022

The IEMA Working Group 2022 published '*Determining Significance For Human Health In Environmental Impact Assessment'* in response to gaps and inconsistencies across existing guidance documents as to how health is assessed in EIA, particularly with regard to significance. The aim of this report is to assist and streamline discussions for consultants producing the assessments and for the decision makers who are reviewing the assessments. The report states that an EIA must identify, describe and assess the direct and indirect significant effects in an appropriate manner of a proposed development on human health. It must include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects, taking into account current knowledge and methods of assessment.

The assessment of the impact on human health was carried out using guidelines set out in Section 5.2.1 above. The effects of the peat extraction activities and all ancillary works on the human environment are assessed in compliance with the EIAR Guidelines as outlined in Chapter 1 (Introduction). Environmental Impacts from the Peat Extraction Phase, Current Phase and Remedial Phase which may also have an impact on population and human health are discussed in this chapter but addressed in more detail in the following chapters: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, Chapter 10 Climate, Chapter 11 Noise and Vibration, Chapter 12 Landscape and Visual, Chapter 13 Cultural Heritage, Chapter 14 Material Assets (including Traffic and Transport) and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

Additionally, the following guidelines, plans and reports have informed the preparation of this chapter:

- Department of Housing, Planning and Local Government (DoHPLG), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018)
- European Commission (EC), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017)

- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006)
- Environmental Impact Assessment of National Road Schemes- A Practical Guide, National Roads Authority/ Transport Infrastructure Ireland, Revision 1, November 2008;
- Failte Ireland EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (2023)
- Health Impact Assessment Resource and Tool Compilation, United States Environmental Protection Agency 2016
- Health Impact Assessment Guidance, Institute of Public Health Ireland. 2009
- Framework for Human Health Risk Assessment to Inform Decision Making developed by the United States Environmental Protection Agency (US EPA). 2014
- Institute for Environmental Management and Assessment (2017) Health In Environmental Impact Assessment: A Primer for a Proportionate Assessment
- Institute for Environmental Management and Assessment (2022) Determining Significance for Human Health in Environmental Impact Assessment
- Central Statistics Office (CSO): Census of Ireland 2022; Census of Ireland 2016; Census of Ireland 2011;
- Meath County Development Plan 2021-2027;
- Two Year Progress Report on Meath County Development Plan 2021-2027 (2023)
- Westmeath County Development Plan 2021-2027;
- Historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan for 1993 (details of which are provided for in Section 2.3.4 in Chapter 2 of this rEIAR).
- Bord na Móna socio-economic report 2017/2018;
- Fitzpatrick Associates, 2011 Energy Crop-Socio-economic Study, Bord na Móna;
- Central Statistics Office Population Change and Historical Perspective. www.CSO.ie

The assessment of the potential for any likely significant effects on population and human health has been undertaken in accordance with Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU and as transposed into Irish Law through Regulations in 2018 (S.I. No. 296 of 2018).

5.2.2 Scoping

Fáilte Ireland

A scoping request was sent to Fáilte Ireland on 2nd December 2021 and a response was received on the 9th of the same month. A summary of the response is provided in Chapter 2 Section 2.6 of this rEIAR, and a copy of the response is provided in Appendix 2-1.

The response included a copy of *Fáilte Ireland's EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects*. The guidelines state that construction and operation of developments can result in an increase in population levels to the area through new economic opportunities and the provision of new facilities such as tourism and recreational amenities. Changes in population can impact the perception of pace of life or safety in a particular location. Impacts upon these issues in areas which rely heavily on tourism or have a particular sensitive tourism generator should be considered. Construction and operation of developments can also cause air and noise, pollution and increase traffic levels. The Failte Ireland guidance document also includes sources of useful information which were considered in this chapter e.g., Failte Ireland website and the Census database.

Owing to the passage of time between the initial scoping request in December 2021 and the preparation of this rEIAR, a subsequent scoping request was issued to Fáilte Ireland on 14th February 2024. At the time of writing this rEIAR in July 2024, no response had been received. Nonetheless, the issues raised by Fáilte Ireland in their initial scoping response have been considered in this chapter.

Health Service Executive (HSE)

A scoping request was sent to the HSE on 7th December 2021 and a response was received on the 22nd of the same month. A summary of the response is provided in Chapter 2 Section 2.6 of this rEIAR, and a copy of the response is provided in Appendix 2-1.

The HSE response states that the scoping document submitted by MKO on 2 December 2021 was studied and it is "*satisfied that the Scoping Document identifies the potential environmental effects (listed above) of the project which will be addressed in the rEIAR.*"

Owing to the passage of time between the initial scoping request in December 2021 and the preparation of this rEIAR, a subsequent scoping request was issued to the HSE on 14th February 2024. At the time of writing this rEIAR in July 2024, no response had been received. Nonetheless, the issues raised by the HSE in their initial scoping response have been considered in this chapter.

5.2.3 Assumptions and Limitations

Assumptions made and limitations to the production of this chapter include the following:

- Limited 1988-specific data to inform the baseline on population levels, household statistics and employment for the study area of this assessment. The 1986 Census baseline data was used for the baseline data, which is considered to be representative of the 1988 environment;
- No health data was included for Census results prior to Census 2011;
- In the absence of detailed information, assumptions have been made on the location of certain existing infrastructure such as rail lines in order to inform the baseline description. These assumptions have been made utilising available aerial imagery.

5.3 Establishment of Baseline (July 1988)

Section 5.2 outlines the clear reasoning for establishing the baseline for this assessment as 1988 (i.e. 3rd July 1988 being the required transposition date of the EIA Directive). This section outlines the baseline environment at that time, specifically as related to population and human health. No Census data were collected in 1988. Census data were collected in 1986, two years prior to the baseline year of 1988. Census data from 1986 have been used to establish the 1988 baseline for this assessment, as the 1986 data are considered representative of the July 1988 environment. For a comprehensive list of activities carried out on site from 1988 to the present day please see Chapter 4 Description.

5.3.1 Landcover and Land use

In 1988, most of the drainage was already inserted, permanent railway lines were laid down and peat extraction was underway on each of the bog units of the Application Site, with the exception of Lisclogher West, where despite the installation of drainage, peat extraction never took place. Several storage, welfare and peat processing buildings were already established at Ballivor Works to the north of Ballivor Bog, adjacent to the Application Site (see Chapter 2 for a full planning history of the Application Site).

Existing onsite infrastructure by 1988 included:

- railway infrastructure (all bogs except Lisclogher-West); and,
- internal machine passes/tracks (all bogs)

Adjacent to the Application Site at Ballivor Works:

- Bulk Loading Facility at the Works of R156 in Ballivor Bog (Planning Grant 1983);

- Workshop and extension at the Works of R156 in Ballivor Bog (Planning Grant 1977);
- Covered Loading Bay at the Works of R156 in Ballivor Bog (Planning Grant 1972); and,
- Silt ponds and drains.

The landcover in 1988 predominantly comprised bare cutaway peat. Around the edges of the bogs and in Lisclogher-West, the Application Site comprised a mix of re-vegetated peat, degraded blanket bog, scrub, low woodland, remnants of high bog and a very small area of conifer plantation.

The five no. bogs of the Application Site were separated by the local road network, woodland, linear strips of agricultural land and residential properties. The bogs were inter-connected by a railway that serviced peat extraction activities. Although these differing bogs had their own distinctive landscape attributes (e.g., scale, shape, and orientation), the general character of the landscape at the time was very similar within each bog except Lisclogher-West Bog. Please see Chapter 4 Description for more details on the 1988 baseline.

5.3.2 Baseline Population

The 'Study Area' for this assessment is defined using the following District Electoral Divisions/ Wards which have been identified from Census 1986 Results, the boundaries of which are equivalent to the following Electoral Divisions today:

- Ballyhealy (CSO ED code 237011);
- Copperalley (CSO ED code 237034);
- Cloghbrack (CSO ED code 167019);
- Killaconnigan (CSO ED code 167046);
- Killyon (CSO ED code 167051);
- Riverdale (CSO ED code 237091);
- Ballynaskeagh (CSO ED code 237015); and,
- Bracklin (CSO ED code 237019).

The above District Electoral Divisions/Wards fall under the Trim Rural District in Meath and the Delvin Rural District in Westmeath, as identified in Table 13 of Census 1991 which presents the 1986 population results[3].

Population data for the Study Area, Counties Meath and Westmeath and the State from the 1986 Census, which is considered representative of the baseline year of 1988 are presented in Table 5-1 below.

Table 5-1 Population Levels from 1986 Census

Area	Population Levels in 1986 Census
State	3,540,643
County Meath	103,881
County Westmeath	63,379
Study Area	2,787

[3] https://www.cso.ie/en/media/csoie/census/census1991results/volume1/C1991_V1_T13.pdf

5.3.3 Employment and Economic Activity

Employment figures for the Census year 1986 were used to inform the employment baseline for 1988. While national and county employment figures are available for from the 1986 Census [4], figures for the individual District Electoral Divisions/ Wards which make up the Study Area are not available from the CSO. Please see Table 5-2 below for national and county employment figures from the 1986 Census.

Table 5-2 Employment Figures for National and County Levels from 1986 Census

Area	Employment Figures in 1986 Census
State	1,091,155
County Meath	30,969
County Westmeath	19,318

5.3.3.1 Bord na Móna Employment

For the period of 1988 – 1989 average employment at Bord na Móna was 3,835, with peak employment being 5,116[5].

The 1986 Census has classified employment figures by Industrial Groups, with the 'Mining, Quarrying and Turf Production' [6] industry group being relevant to Bord na Móna employment. National and county figures under this industrial group are presented in Table 5-3 below.

Table 5-3 Mining, Quarrying and Turf Production Industry Employment Figures from Census 1986 (1988 Baseline)

Area	Employment Figures in Mining, Quarrying and Turf Production Industry in 1986 Census
State	8,367
County Meath	1,034
County Westmeath	454

5.3.3.2 Employment at the Application Site

Employment figures at the Application Site for the year 1988 are estimated at 80 permanent employees and 20 seasonal employees.

The earliest employment figures available for the Derrygreenagh Bog Group, in which the Ballivor Bog Group and thus the Application Site are located, are from 1999 and indicate a total of 96 permanent and 31 seasonal employees for the wider bog group. Production operated during the production season, 7 days per week at 12-15 hours per day, weather permitting.

[4] https://www.cso.ie/en/media/csoie/census/census1986results/volume6/C_1986__V_6_T11.pdf
[5] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry*
[6] https://www.cso.ie/en/media/csoie/census/census1986results/volume6/C_1986__V_6_T11.pdf

5.3.4 Services

The nearest village to the Application Site in 1988 was Ballivor, which is located 2.2km to the east of the Application Site in County Meath. The village provided a range of services such as educational, recreational, places of public worship and retail. Further services were also found in the villages of Delvin and Raharney, 2.5 km north-northwest and 3.7km to the west of the Application Site, respectively. The available OSI historical 25" mapping indicates that by the 1900s, religious, educational, judicial and retail services were already established in Ballivor Village. It is therefore considered that at a minimum, these services were well established in the village by 1988.

5.3.5 Education

The nearest school to the Application Site boundary in 1988 was Coolronan National School (established 1959) in present day Cloghbrack ED (Cloghbrack DED/ Ward in 1988), located approximately 1.3 km southeast of the Application Site. Columba College in Killucan, established in 1948 was the nearest Secondary school to the Application Site in 1988, located approximately 5km southwest of the Application Site.

5.3.6 Access and Transport

Aerial imagery from 1988 indicate that present day site entrances were also in existence in 1988. Aerial imagery from 1988 also indicates that the bogs were interconnected via rail lines which traversed the local road network between Lisclogher and Bracklin Bogs and Carranstown and Ballivor Bogs.

In 1988, the main entrance point to the Application Site was from the Ballivor-Raharney road (designated the R156 in 1993) which runs in an east-west direction through the Application Site separating Ballivor Bog from Carranstown Bog. Historical mapping indicates this road was in situ since at least the 1840s. Aerial imagery indicates both the main entrances were inserted off the R156 by 1973. The Application Site was also accessed by several local roads to the north, south, east and west. A local road ran northwest to southeast separating Lisclogher East from Lisclogher. Various third-class roads provided access to the Application Site in 1988 as well as public rights of way into Lisclogher and Ballivor. Historical mapping from the 1940s indicates that these roads were already present. Aerial mapping from 1988 indicates that one off housing and farms were located along the roads that served the Application Site.

Two level crossings were present at the Application Site in 1988; one at the Ballivor-Raharney (R156) road to facilitate train crossing from Ballivor Bog to Carranstown Bog and vice versa, and one to facilitate crossing from Bracklin Bog to Lisclogher Bog across a local road.

Standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all the Applicant's Móna crossing gates. Catch points were also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trans before reaching the level crossing.

The road network and Application Site entrance points present in 1988 remained in place throughout the decades and are still in use today.

5.3.7 Amenities and Community Facilities

Amenities and community facilities located in the surrounding areas present in 1988 included the local GAA clubs, namely Ballivor GAA club and the Royal Canal Walk which runs along the Royal Canal 3.3km south of the Application Site.

5.3.8 Human Health

There is no human health data for 1988 available for the Study Area, Counties or State. The Census 2011 introduced questions on general health, therefore there is no health data available for Census years previous [7]. As such the 2011 Census health data has been used to infer the 1988 baseline. Census 2011 Human Health results for the State and Counties are presented in Table 5-14 below. In general, the percentage health breakdown for the State and County populations are very similar. The State and Counties all reported in the range of 90% for a combined 'very good' and 'good' health.

Table 5-4 Human Health Data from Census 2011

	Very Good	Good	Fair	Bad	Very Bad	Not Stated
State	2,767,681	1,282,956	368,131	57,243	12,418	99,823
County Meath	117,657	49,209	11,817	1,693	371	3,388
County Westmeath	51,061	24,842	7,150	1,132	267	1,712

5.3.8.1 Air Quality

5.3.8.1.1 *Dust*

There are no data pertaining to dust monitoring at the site or surrounding area for the period 1988. Monitoring for dust deposition has been undertaken on the Application Site as a requirement of the IPC Licence (Reg. P0501-01) for the Application Site since 2000. The monitoring results are reported in the Annual Environmental Report (AER) each year, which are included as Appendix 4-3 of this rEIAR. Monitoring typically takes place between April to September of each year to correspond to the peat harvesting season. Monitoring is conducted at 1 no. location on the Application Site: DM-03 Ballivor. Monitoring results for location DM-03 are available in the AERs for 2001, 2002 and 2008 – 2020.

Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. High levels of moisture either retained in soil or as a result of rainfall help suppress the generation of dust due to the cohesive nature of water between dust particles. Rain also assists in removing dust from the atmosphere through washout. It is typical to assume no dust is generated under 'wet day' conditions where rainfall greater than 0.2mm has fallen (USEPA, 2006). A review of data for Mullingar metrological station which is located approximately 16km southwest of the Application Site states that there were 209 days (57% of the year) with greater than 0.2mm rainfall annually over a 30-year averaging period (1979 – 2008) (Met Eireann, 2024). Therefore, the majority of the time dust emissions were reduced naturally due to meteorological conditions. Please see Chapter 9 Air Quality for further details.

5.3.8.1.2 *NO_2, PM_{10} and $PM_{2.5}$*

Long-term air monitoring data has been reviewed and used to determine background concentrations for the key pollutants of NO_2, PM_{10} and $PM_{2.5}$ in the region of the Application Site. There are no data pertaining to air quality and emissions at the Application Site or surrounding area for the period 1988, with specific pollutant concentrations only being available from 2006 onwards However it can generally

[7] *Census 2011 Profile 8 Our Bill of Health page 26*
https://www.cso.ie/en/media/csoie/census/documents/census2011profile8/Profile_8_Full_document.pdf p26

be assumed that historical air quality dating back to 1988 was of a lesser quality than in more recent years. Please see Chapter 9 Air Quality for further details.

5.3.8.1.3 *CO_2 Emissions*

It is estimated that a total of 69,311 tonnes of CO_2 emissions arose from the Application Site in the year 1988. Please see Appendix 10-1 Carbon Calculations for more details on how this figure was derived.

5.3.8.2 Noise

In 1988, different types of machinery were in use on the Application Site during different seasons of the year, for the purposes of peat extraction activities and all ancillary works and are listed in Chapter 4 Description. Additionally, vehicular movements to and from the Application Site made use of existing roads to reach various end users. Potential noise impacts from plant and equipment would have been experienced intermittently at any given sensitive receptor location during the active periods due to the continuous movement of machinery around the bogs, i.e., no machinery operated continuously in the one location near sensitive receptors.

5.3.8.3 Health & Safety

As one of the country's largest and longest established industrial employers, the Applicant has long standing health and safety protocols in place across all their sites. Below is a list of training that was in place across all Bord na Móna landholdings including the Application Site since the 1940s and were part of the day-to-day training and operations during the year 1988.

- Fire safety;
- First Aid;
- Operation and maintenance of plant & machinery;
- Use of hand & power tools;
- Site Safety;
- Road Safety;
- Safe Workshop Operation Procedures;
- Transport Operation Procedures;
- Hazard Identification, Risk Assessment; and,
- Working at Heights.

5.3.8.4 Vulnerability of the Project to Major Accidents and Natural Disasters

There are no reports of natural disasters at the Application Site in the year 1988 (or indeed prior to this period). Measures to prevent and contain such events that were in place in 1988 are discussed below. These measures formed part of day-to-day bog operations and management.

Ireland is located in a geologically stable country with a mild temperate climate. Therefore, historically there has been limited potential for natural disasters to occur within the Application Site. The potential natural disasters that may occur on a site such as the Application Site may include bog fire, flooding and landslides.

For full details on the vulnerability of the Application Site to major accidents and natural disasters, please see Chapter 15 of this rEIAR.

5.3.8.4.1 *Bog Fires*

There are generally two potential sources of fire at a bog, internal and external:

Internal Sources:

- Heating peat;
- Machinery;
- Cigarettes and matches; and,
- Hot work production areas and rail lines.

External Sources:

- Burning of gorse / heather / brush;
- Cigarettes and matches; and,
- Trespass of motorbikes.

Formal fire safety procedure documentation is not available for 1988. However personal communication with former personnel indicate that the below bulleted measures were in place at the Application Site in 1988:

- All employees maintained vigilance on bog areas at all times, but particularly during production season and during high fire risk periods.
- Fire prevention and awareness training was provided to all employees as part of induction training. Refresher training provided periodically. Specific fire training provided to all relevant employees.
- Machines were inspected and washed / blown down on a daily basis.
- Peat Piles prone to heating were closely monitored.
- Smoking was restricted to designated areas and was prohibited in machines and on bog areas.
- In order to minimise the risk of fire, peat sales plans took account of piles prone to heating.
- Areas were left safe from the threat of fire following hot work carried out on bog or on rail lines.
- Fire watch was carried out (minimum period of one hour) by members of production team at the end of each production day.
- Fire patrols were organised by local management / operations leaders during periods of high fire risk.
- Production operations were suspended as necessary during periods of high fire risk.

Records of Fires at the Application Site

There is no known record of bog fires at the Application Site in 1988.

5.3.8.4.2 *Flooding*

The Applicant has no records of flooding at the Application Site in 1988 or otherwise. Furthermore, there are no recurring flood incidents or instances of historical flooding identified within the Application Site on historic OS maps or in OPW flood maps. Identifiable map text on local available historical 6" or 25" mapping for the site does not list any areas within the Application Site as "*liable to flood*".

The risk of flooding is addressed further in Chapter 8: Hydrology and Hydrogeology and Appendix 8-1 Flood Risk Assessment.

5.3.8.4.3 *Peat Landslide*

Geological Survey Ireland (GSI) does not have any records of historic landslides within the Application Site or in the surrounding lands in 1988. The closest recorded landslide event (1999) is mapped at

Girley Bog, Chamberlainstown, approximately 12km northeast of Lisclogher Bog. Girley Bog is classed as a raised intact bog. "No apparent Impact" is recorded for this event.

Please see Chapter 7 Land Soil and Geology for details.

5.4 Population Data

Population data for the Study Area, Counties Meath and Westmeath and the State for the years 1986 to 2022 have been presented in this section. Census data has been collated and analysed for the following years:

- Census 1986
- Census 1991
- Census 1996
- Census 2002
- Census 2006
- Census 2011
- Census 2016
- Census 2022

These particular years have been selected to inform the Peat Extraction Phase (July 1988 - June 2020) and Current Phase (June 2020 - Present) to decipher the effects that the Project has on population in the Study Area. It is not possible to assess the Remedial Phase in terms of population as there is no prospective population data available.

Figure 5-1 below shows population change in the Study Area from years 1986 to 2022. Steady growth is observed, with the population increasing over time. Similar trends are observed for county levels, illustrated in Figure 5-2 and national levels, illustrated in Figure 5-3 below. A more detailed overview of national, county and Study Area population figures is detailed in Table 5-5 below.

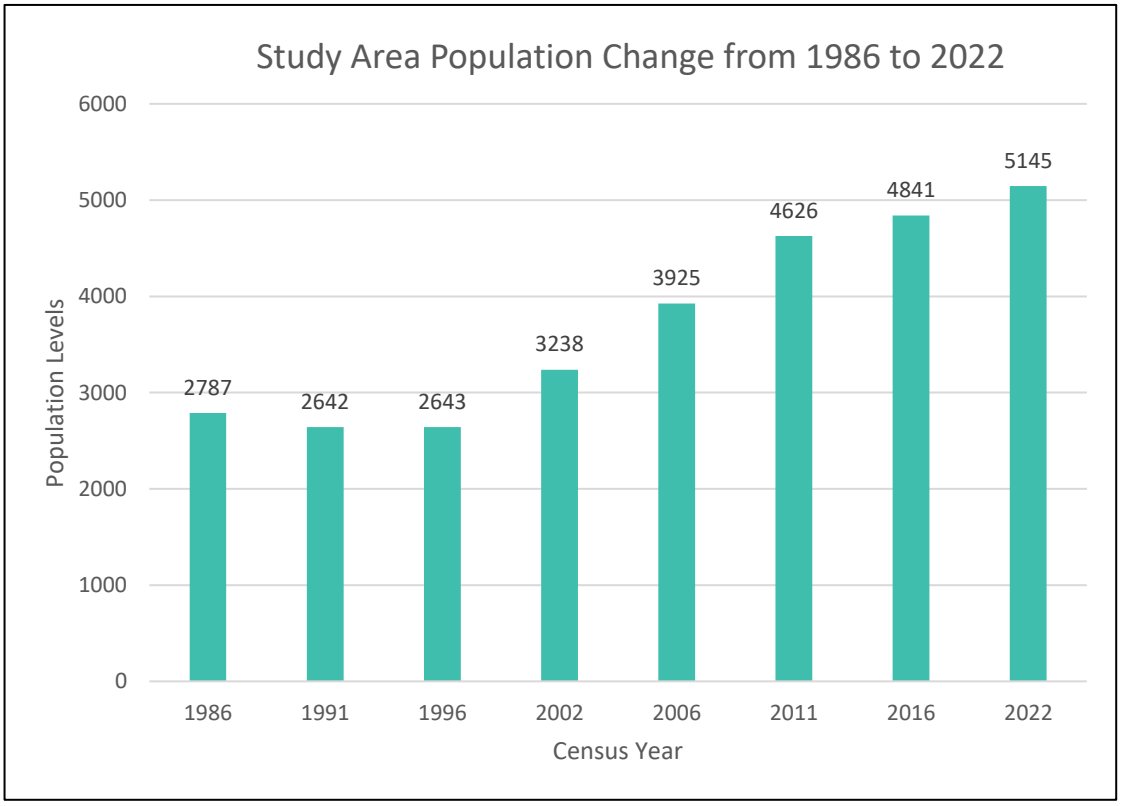


Figure 5-1 Study Area Population Change from 1986-2022. Source https://data.cso.ie/

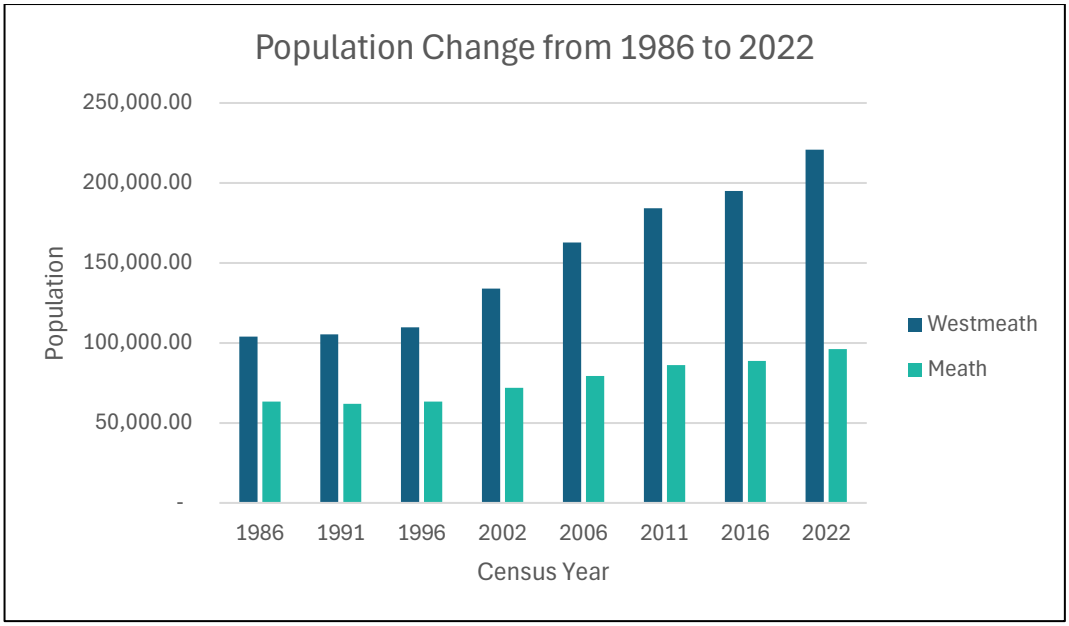


Figure 5-2 County Population Change from 1986-2022. Source https://data.cso.ie/

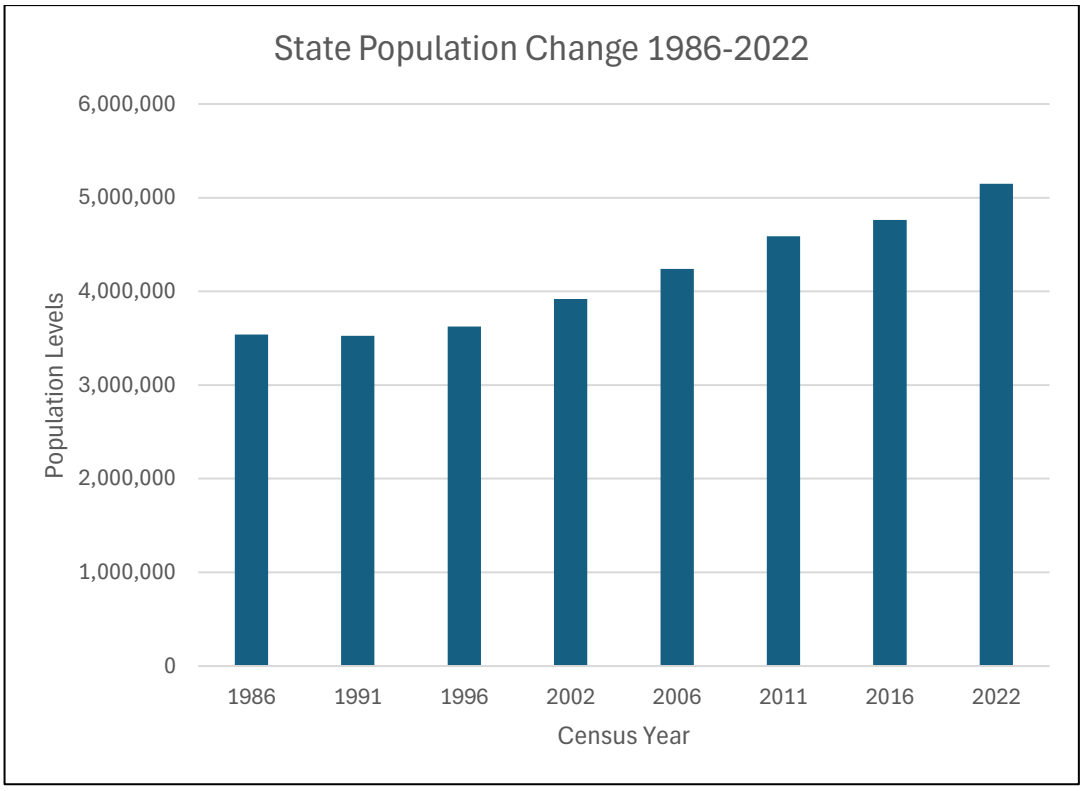


Figure 5-3 State Population level changes from 1986-2022. Source https://data.cso.ie/

Table 5-5 Study Area Population levels 2006-2022

Area	Population Levels							
	1986	1991	1996	2002	2006	2011	2016	2022
State	3,540, 643	3,525,719	3,626,087	3,917,203	4,239,848	4,588,252	4,761,865	5,149,139
County Meath	103,881	105,370	109,732	134,005	162,831	184,135	195,044	220,826
County Westmeath	63,379	61,880	63,314	71,858	79,346	86,164	88,770	96,221
Study Area	2,787	2,642	2,567	3,238	3,925	4,626	4,841	5,145

5.4.1 Employment and Economic Activity

Employment figures for the census years 1986, 1991, 1996, 2002, 2006, 2011, 2016 and 2022 for Counties Meath and Westmeath are illustrated in Figure 5-4 below while national employment figures are illustrated in Figure 5-5. A slight dip in national and county employment figures are presented in Figures 5-4 and 5-5 which correspond to the 2008 global economic recession which resulted in a decrease in employment in 2011. Despite this, the 2016 Census results for both county and national levels see an increase in employment figures with this trend continuing for the 2022 Census also.

Study Area employment figures are available on the CSO website for the years 2002, 2011, 2016, and 2022 and totalled 1,323, 1,650, 1,844 and 2,340 respectively. These employment figures indicate a general increase over the years and follow the employment trends at County and State level for the same period. The increase in employment figures also correlate with the growing population level.

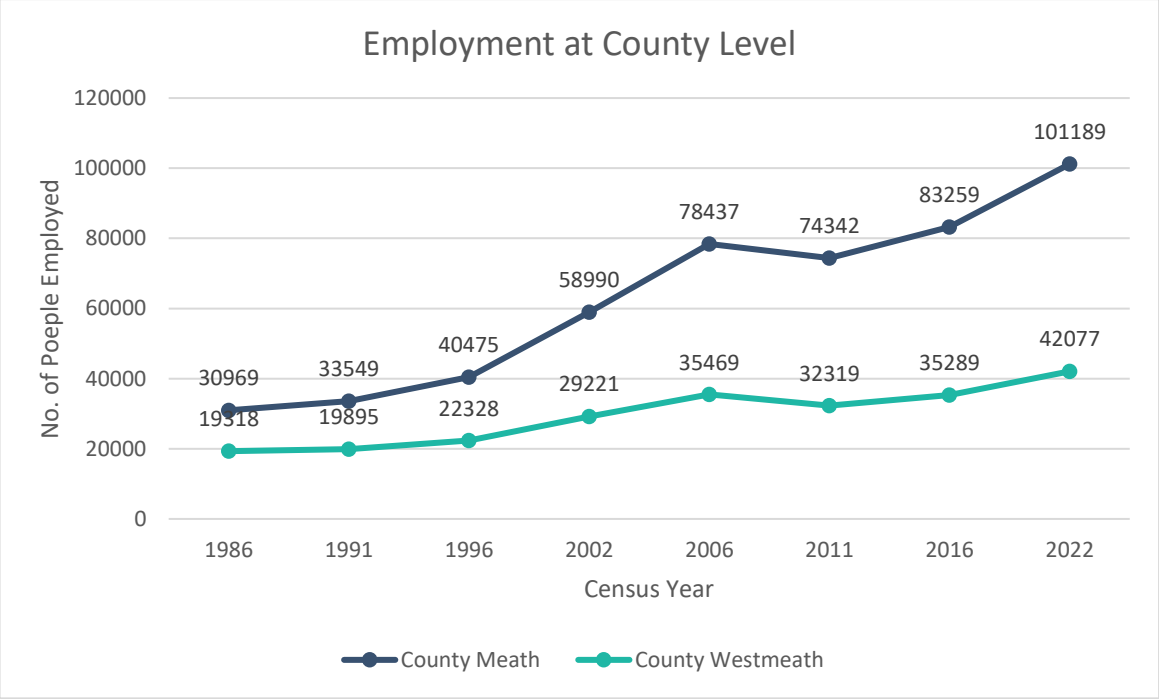


Figure 5-4 Employment at County Level for Census 1986- 2022

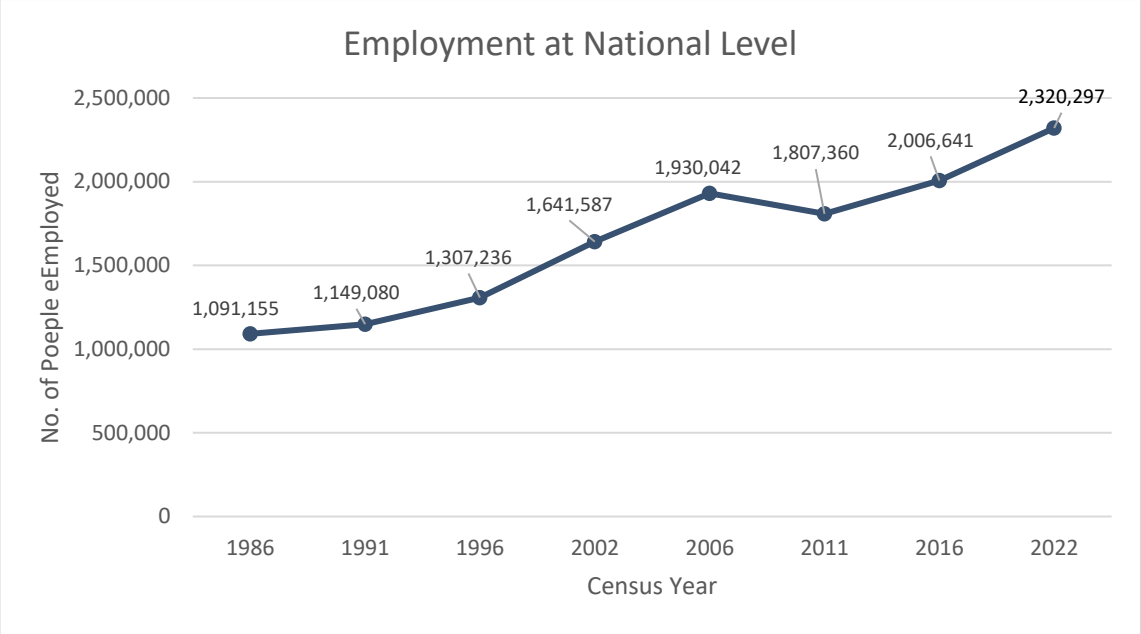


Figure 5-5 Employment at National Level for Census 1986- 2022

5.4.1.1 Bord na Móna Employment

According to the "Energy Crop Socio-Economic Study" by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland. These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. In October 2017, there were 2,012 workers employed by Bord na Móna in Ireland across all departments, with a further 88 employed in the UK. It is estimated that the 2,012 jobs provided by the Applicant equated to 1,865 full time equivalents. Of these 2,012 jobs, 1,734 jobs were directly or indirectly located in the Midland region including Westmeath.

The Census for years 1986, 1991, 1996, 2002, 2006, 2011, 2016 and 2022 has classified employment figures by Industrial Groups, with the 'Mining, Quarrying and Turf Production' industrial group being relevant to Bord na Móna employment. National and county figures under this industrial group are presented in Table 5-6 below. Figures for the Study Area for every of the above years under this industry category are not available on the CSO website, therefore national and county figures have been assessed to establish general trends. The figures indicate an overall decline in figures in the mining, quarrying and peat production industry group, which can be largely attributed to the ceasing of peat production in 2020.

In 2011, County Meath record the highest number of people employed in the Mining, quarrying and turf production industry [8]. The 2011 Census Results have further categorised this industry for national levels, with 1,512 people being employed in the 'extraction and agglomeration of peat'. This accounts for 27% of the total people employed in the mining, quarrying and turf production group.

[8] https://www.cso.ie/en/media/csoie/census/documents/census2011profile3/Profile_3full_doc_for_web_sig_amended.pdf

Table 5-6 Census Figures for State, County Meath and Westmeath in Mining, Quarrying and Turf Production Group for 1986-2022

	1986	1991	1996	2002	2006	2011	2016	2022
State	8,367	6,015	5,774	6,658	7,751	5,674	5,055	4,756
County Meath	1,034	839	795	726	905	741	704	707
County Westmeath	454	219	236	201	238	153	130	149

5.4.1.2 Employment at the Application Site

At the Application Site, the majority of peat extracted was supplied to the horticultural industry. According to the Irish Farmer's Association 'Labour Review of Horticulture in Ireland (2016)' and the 'Key Issues Consultation Paper in Relation to a Review of the use of Peat in the Horticultural Industry (2020)', the Irish commercial horticultural industry was valued at €437 million in 2018 with an estimated 6,600 employed full time in primary production activity and a further 11,000 employed in value added and downstream businesses (not including the wholesale trade) resulting in an employment value of €497m.

In recent years, the Applicant employed on average 20 No. staff full time in peat extraction activities and all ancillary works at the Application Site as well as 5 seasonal employees per annum from 2013 to June 2020. Since peat extraction ceased, the Applicant employed 2 No. permanent staff and 4 No. seasonal staff for the removal of stockpiled peat off the bogs for transportation to Kilberry, Edenderry Power Station and Derrinlough Briquette factory. By the end of 2023, all stockpiles were removed off the bogs.

Currently, 5 no. staff are also employed in environmental monitoring and maintenance is also ongoing at the Application Site across the Derrygreenagh Bog Group, in which the Application Site is located. Condition 11 of the IPC Licence pertains to required ongoing sampling, analyses, measurements, examinations, maintenance and calibrations as set out in Schedule 1 and 3 of the licence. Please see Appendix 4-1 IPC Licence for details.

5.4.2 Services

The nearest village to the Application Site is Ballivor which is located 2.2km to the east in County Meath. The village provides a range of services such as educational, recreational, religious, and retail. Further services are also found in the villages of Delvin and Raharney, 2.5km northwest and 3.7km west of the Application Site, respectively.

5.4.3 Education

The nearest school to the Application Site is Coolronan National School, located approximately 1.3km southeast of the Application Site. Scoil Columbain is located 2.2km east of the Application Site. Columba College in Killucan is the nearest Secondary school located approximately 5km southwest of the Application Site.

5.4.4 Access and Transport

The Application Site is accessed via the R156 Regional Road which traverses the centre of the Application Site. At present, the 115C bus travels between Ballivor and Raharney along the R156

through the centre of the Application Site several times a day. The 115C continues to Mullingar from where connections to Athlone, Tullamore, Kells, Portlaoise and Dublin can be made.

5.4.5 Bord na Móna Housing

The Applicant has a long history of providing housing for its employees, which began with the provision of hostel accommodation for migrant male workers who were housed during the 'Emergency Years' to produce fuel supplies from the Allen Bogs. These hostels housed over 100 men in some locations. As well as accommodation and meals, the hostels provided 'wet' and 'dry' canteens, film showings and recreation halls. This was followed by the Cottage Schemes in 1950, when seasonal work was replaced by more permanent opportunities.

The Turf Development Act 1950 contained provisions for the expansion of the Applicant's activity to bring production capacity up to two million tonnes of machine sod turf per annum across all Bord na Móna bogs and plans for four additional power stations. In addition, under Section 5(1), it gave the Applicant the authority to construct housing for the permanent workforce. Nine schemes comprising a total of 582 houses were submitted to the Minister of Industry and Commerce for approval and site development works commenced in 1951. This included over 100 houses in Co. Westmeath and housing in Co. Meath. The first housing schemes were designed by Frank Gibney and were built at Clonast, Mount Dillon, Littletown, Timahoe South and North, Boora and Derrygreenagh.

A total of 9. No houses were built by the Applicant for employees in Ballivor Village in 1956. Within 30km of the Application Site, the Applicant built a further 100 No. houses at the Derrygreenagh Park Estate in Rochfortbridge, Co. Westmeath, as well as 7 No. one-off houses in the County and 1 No. one-off house in Co. Meath. All these houses have since been transferred into private ownership.

5.4.6 Amenities and Community Facilities

Most of the amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the area are in the nearby settlements of Ballivor, Raharney and Delvin as well as Killucan 6 km to the west. Other amenities in the area include the National Exotic Animal Sanctuary, Clay Target Shooting, Coolronan Raceway Club and the Royal County Model Flying Club.

The nearest marked walkway is the Royal Canal Walk which runs along the Royal Canal 3.3km south of the Application Site.

5.5 Human Health

Tables 5-7 and 5-8 below details the general health of persons by percentage for the State, County Meath and County Westmeath and the Study Area for 2011, 2016 and 2022. The Census 2011 introduced questions on general health, therefore there is no health data available for Census years previous.

In general, the percentage health breakdown for the State, Counties and Study Area populations are very similar. The study area State and Counties all reported in the range of 90% for a combined 'very good' and 'good' health. The majority of electoral divisions in the Study Area reported a lower percentage than the State and Counties for those who have a 'bad' and 'very bad' health. Therefore, it can be concluded that those living in the Study Area consider their health to be in a better condition that the State and County average.

Table 5-7 Percentage General Health Breakdown for the State and Counties Meath and Westmeath as reported in the 2022 ,2016 and 2011 Census. Source www. CSO.ie

	Very Good			Good			Fair			Bad			Very Bad			Not Stated		
	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011
State	53.23%	59.4%	60.3%	29.66%	27.6%	28%	8.64%	8%	8%	1.41%	1.3%	1.2%	0.33%	0.3%	0.3%	6.74%	3.3%	2.2%
Westmeath	52.1%	58%	59.2%	30.24%	28.7%	28.8%	8.81%	8.2%	8.2%	1.38%	1.3%	1.3%	0.29%	0.3%	0.3%	7.19%	2.9%	2%
Meath	57.1%	63%	63.8%	29.61%	26.48%	26.7%	7.56%	6.68%	6.4%	1.17%	1.3%	1%	0.27%	0.2%	0.2%	4.29%	2.4%	1.8%

Table 5-8 Percentage General Health Breakdown for the study area as reported in the 2022, 2016 and 2011 Census. Source www. CSO.ie

Study Area- Electoral Divisions	Very Good			Good			Fair			Bad			Very Bad			Not Stated		
	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011	2022	2016	2011
Bracklin, Westmeath	56%	60%	59.2%	33.1%	30%	28.9%	7.27%	8.5%	6.8%	0	0.7%	1.1%	0	0	0	3.64%	0.4%	1.1%
Ballyhealy, Westmeath	53.98%	58%	65.7%	28.02%	31.3%	23%	7.67%	9%	6.4%	1.77%	0.7%	2.5%	0	0	0.4%	8.55%	1%	1.4%
Copperalley, Westmeath	58.27%	56%	63%	25.94%	33.8%	26.7%	8.65%	6.5%	7%	0.75%	1.4%	1.8%	0.38%	0.4%	0	6.02%	1.1%	1.1%
Cloghbrack, Meath	55.25%	61.3%	59.6%	33.51%	28.28%	29.3%	6.52%	6.9%	7.6%	0.75%	2%	1.4%	0.54%	0	0.4%	3.44%	1.4%	1.8%
Killaconnigan, Meath	57.16%	65%	66.4%	29.56%	24%	26.4%	8.27%	6.7%	5%	1.70%	1.07%	0.8%	0.39%	0.13%	0.3%	2.92%	3%	0.9%

Killyon, Meath	55.46%	63%	62%	31.43%	27.8%	24.7%	5.55%	6.8%	7.7%	1.18%	1%	1.2%	0.50%	0.4%	0	5.88%	1%	5%
Riverdale, Meath	56.70%	67%	63.8%	30.29%	26%	25.1%	8.74%	5.4%	9.3%	1.55%	0.9%	1.17%	0	0.2%	0.2%	2.72%	0.4%	0.4%
Ballynaskeagh Westmeath	57.52%	67.3%	65.3%	31.70%	22.3%	24.25%	8.17%	7%	8.2%	1.31%	1.7%	1.5%	0.33%	0	0	0.98%	1.4%	0.75%

5.5.1 Air Quality

5.5.1.1 Dust

Monitoring for dust deposition has been undertaken on the Application Site in the past as a requirement of the IPC Licence for the Application Site. Monitoring results for 2001-2023 are reported in their respective Annual Environmental Report (AER), which are included as Appendix 4-3 of this rEIAR. Monitoring results for location DM-03 Ballivor are available in the AERs for 2001, 2002 and 2008 – 2020. No dust monitoring was carried out at the Application Site in 2021 and 2022 due to the cessation of the peat extraction in June 2020.

There were no results detailed in the AER for 2007, however, it was noted that there was an exceedance of the limit value at this location due to an excavator operating directly adjacent to the dust gauge thereby causing a localised non-compliance event. There have not been any exceedances of the limit value of 350 mg/m^2/day over the period 2008 – 2020. Please see Chapter 9 Air Quality and Appendix 4-3 Annual Environmental Reports (AER) for further detail.

5.5.1.2 NO_2, PM_{10}, $PM_{2.5}$

Long-term NO_2 monitoring has been carried out at the rural Zone D locations of Kilkitt Co. Monaghan and Emo, Co. Laois with data available for the period 2006 – 2022. Data from 2006 – 2022 has been reviewed in the absence of older historic data. Long-term PM10 monitoring has been carried out at the rural Zone D location of Kilkitt Co. Monaghan with data available for the period 2006 – 2022. Monitoring of PM2.5 is undertaken at the rural Zone D location of Claremorris Co. Mayo.

The EPA state that air quality is improving over time (EPA, 2023) as a result of the introduction of various policies and measures particularly in relation to road transport emissions and the use of cleaner fuels and the gradual introduction of hybrid and electric vehicles.

Please see Chapter 9 Air Quality for further details on trends in Air Quality for NO_2, PM_{10}, $PM_{2.5}$.

5.5.1.3 CO_2 Emissions

Trends in Greenhouse Gas emissions at a national level are available in annual reports by the EPA. The most recent EPA report entitled 'Ireland's Provisional Greenhouse Gas Emissions 1990 – 2022' (EPA, 2023) reviews national emissions in 2022 and trends in emissions from 1990.

The CO2 emissions associated with the peat extraction activities and all ancillary works over the period 1988 – 2020 were calculated. On average over this 33-year period there was 81,911 tonnes of CO2 per annum released from the Application Site. It is estimated that a total of 2,703,053 tonnes of CO_2 emissions arose from the Application Site in the year during the period of 1988 to 2020. Annually this equates to 0.03% of Ireland's 2021 – 2025 carbon budget of 295 MtCO2e or 0.05% of Ireland's more stringent 2030 – 2035 carbon budget of 151 MtCO2e. Please see Chapter 10 Climate and Appendix 10-1 Carbon Calculations for more details.

5.5.2 Water Quality

There is 1 no. mapped Public Water Supply Scheme (PWS) within 3 km of the Application Site. The Source Protection Area (SPA) for the Ballivor PWS is located to the east of Carranstown and Bracklin bogs, approximately 1.5 km north of Ballivor village. This SPA is more than 2km from the boundary of the Ballivor Bog Group. A search of private well locations (wells with location accuracy of 1–100m were only sought) was undertaken using the GSI well database (www.gsi.ie). One well (GSI Name: 2625SWW072) was identified in the east of Ballivor Bog in the townland of Clonycavan. This well reports a poor yield class of 8.7m3/day. Several additional wells with a location accuracy of 1km are

mapped in the vicinity of the Ballivor Bog Group. These wells all have a poor yield class. As these wells are mapped only to an accuracy of 1km and therefore assessing potential impacts on these wells cannot be undertaken in any reliable manner.

The GSI also map several additional private boreholes and wells in the vicinity of the Application Site. These private water supplies are reliant on groundwater flows in the deeper bedrock aquifer underlying the glacial deposits.

Deep groundwater recharge from the Application Site to the underlying bedrock aquifers will have been minimal. The restriction of recharge relates to the generally impermeable layers which underlie much of Irelands' bogs leading to a 4% recharge coefficient for the bogs. Therefore, the majority of the groundwater drainage and seepage in the bogs would have a lateral flow direction, discharging into the perimeter drains and entering the surface water drainage network in the lands surrounding the bogs.

Please see Chapter 8 Hydrology and Hydrogeology for further details.

5.5.3 Noise

From 2000 onwards, the Application Site has operated under IPC Licence P0501-01. Conditions 8 and 3 of the IPC Licence includes limits on noise levels at the Application Site. The relevant noise level limit is 55dB LAeq, 30min at noise-sensitive locations. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the Application Site for that period. For further detail on Noise, please refer to Chapter 11 Noise and Vibration.

5.5.4 Health & Safety

The Applicant has long been a cognisant of Health and Safety. Following a number of explosions in Lullymore Briquette Factory in the late 1940s and early 1950s[9], the comprehensive scheme for accident prevention was devised[10]. In 1958, a permanent committee was established within Bord na Móna to administer accident prevention schemes. Each Works site had a first aid team consisting of trained volunteers who partook in regular training and administered first aid as required during operations. In 1981, a new safety policy was adopted across the company.

Since 2000, the Application Site has been operating under IPC Licence P0501-01. Condition 13 of the IPC Licence states that it is the responsibility of the license holder (the Applicant) to ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure includes provision for minimising the effects of any emergency on the environment. As part of the Applicant's obligation to submit annual environmental reports, the Applicant must include the time, location, description and frequency of incidents such as explosions, contaminations, fires, uncontrolled releases and complaints to the EPA and all incidents must be investigated.

The Applicant recognises the proper management of safety, health and welfare as a core business value. It acknowledges its obligations, both legal & moral, as an employer to manage and protect the safety, health and welfare of its employees and others who may be affected by its activities, and in doing so, commits to achieving and maintaining the highest standards of Health & Safety reasonably practicable. Please see Appendix 5-2 for a copy of the Applicant's Safety Statement which sets out arrangements to secure & manage safety, health and welfare at places of work within the Applicant's peat operations. The through implanting the Safety Statement, the Applicant comply, as a minimum, with all statutory requirements, common law duties, codes of practice and best industry practice relating

[9] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 84*
[10] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 102*

to peat operations activities, including the Safety Health & Welfare at Work Act 2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013.

All peat operating employees receive training and instruction to ensure that they fully understand the hazards of their work area, the control measures put in place to minimise the risks and the emergency procedures at the facility. Training is coordinated by an in-house training specialist in conjunction with management and health & safety personnel. The services of competent persons / organisations are employed, where necessary, to carry out all other required training. Training is repeated periodically as appropriate. Training provided to all peat operating staff includes:

- Fire safety
- First Aid,
- Operation of plant & machinery
- Manual Handling
- Chemical Safety
- Machine Guarding
- V.D.U. Safety
- Use of hand & power tools
- Site Safety
- Road Safety
- Use of Equipment
- Safe Workshop Operation Procedures.
- Transport Operation Procedures
- Hazard Identification, Risk Assessment
- Work at Height
- Legislation
- Confined Space Entry
- Office safety

Additional training is provided in the following circumstances as necessary; -

- A change in work practices.
- The introduction of new systems of work.
- A change in equipment / machinery.
- The introduction of new technology.

5.5.5 Vulnerability of the Project to Major Accidents and Natural Disasters

As detailed in Section 5.3.8.4 above, Ireland is located in a geologically stable country with a mild temperate climate. Therefore, historically there has been limited potential for natural disasters to occur within the Application Site. The potential natural disasters that may occur on a site such as the Application Site may include bog fire, flooding and landslides.

For full details on the vulnerability of the Application Site to major accidents and natural disasters, please see Chapter 15 of this rEIAR.

5.5.5.1 Bog Fires

The Applicant's focus when it comes to the prevention and management of bog fires is:

- Protection and safety of employees and members of the public;
- Protection of external property;
- Protection of the Applicant's property; and,
- Protection of habitats and biodiversity.

At present, fire safety and awareness training is provided as part of the Applicant's general safety induction with reoccurring refresher training every three years. Please see Appendix 5-1 Fire Prevention & Fire Fighting Procedures for Peat Production Bogs for further details regarding present fire safety measures.

To ensure no instances of internal fire sources, all Bord na Móna staff:

- Receive fire training and refresher training provided periodically. The Applicant's fire safety training include:
  - Fire Safety Training includes the following:
  - General Fire safety awareness and fire detection / prevention.
  - Use of fire extinguishers.
  - Use of machinery in firefighting.
  - Use of pumps, floatation pumps and fire rollers.
  - Fire prevention for machinery, including washing and blowing down.
  - Use and maintenance of PPE used in firefighting.
  - Dealing with small fires.
  - General Health and Safety, including Hazard Identification and Risk Assessment.
- Follow the procedures to minimise fire hazards on machinery as outlined in the Bord na Móna Fire Prevention & Fire Fighting Procedures for Peat Production Bogs.

Bord na Móna Resource Managers designate control persons for firefighting. Their responsibilities include:

- Management of persons (including members of the public) entering and leaving sites under control.
- Co-ordination of persons on sites under their control.
- Liaison with Fire and other emergency services as necessary.
- Organisation of welfare facilities.
- Establish and maintain frequent contact with relevant external organisations and local fire services.
- Each Bog Area operation leader / team leader / supervisor must ensure the following:
  - Firefighting machinery is available and ready for use if required.
  - Minimum of one fire roller unit (Tractor with attached roller) is available and ready for use in each area.
  - Lights are working on all machines.
  - Flashing beacons are ready and are placed on all relevant machines during firefighting activities.
  - All machines have appropriate numbers of fire extinguishers.
  - Fire extinguishers checked daily, and a reserve number are kept.
  - All tractors have fire buckets and shovels, and all dozers have afire bucket.
  - Water sources on or adjacent to bog are appropriate, maintained, and available for use during firefighting.
  - Fire signs are in place and maintained.
  - Maps and aerial photographs provided to areas are in place and maintained.
  - Emergency contact numbers for each area in place

Records of Fires at the Application Site

A bog fire occurred at Lisclogher West and Lisclogher bogs in 2008. This fire occurred due to dry weather conditions. In both cases, the EPA was contacted, and corrective measures were put in place and the fires were brought under control. No Bord na Móna staff or third parties were involved in the outbreak of the fire and the fires were contained by Bord na Móna staff within the Application Site boundary. The 2008 dust monitoring results collected from the dust monitor located at Ballivor Bog entrance or that year were within the emission limit of 350mg/m^2/day. There are no other records of

fires at the Application Site. Since 2000, it has been a condition of the IPC Licence that fires are reported to the EPA in the Annual Environmental Reports.

5.5.5.2 Flooding

The Applicant have no records of flooding at the Application Site from 1988 onwards. Furthermore, there are no recurring flood incidents or instances of historical flooding identified within the site on historic OS maps or in OPW flood maps. The Application Site lies outside of the OPW's present day indicative river and coastal flood zones. In addition, the GSI Groundwater Flood mapping does not record any groundwater flood zones with the Application Site.

The Local Authority Strategic Flood Risk Assessment (SFRA) mapping indicates that areas in the northwest of Lisclogher Bog are vulnerable to fluvial flooding. However, site walkovers have revealed that the EPA incorrectly mapped a river to cross Lisclogher Bog casting doubt on the validity of the flood zones in this area.

CFRAM mapping includes modelled flood levels for the 10-year and 100-year flood events. These levels, modelled near Ballivor village, range from 64.19 – 65.34m OD and are well above the current outfall pipe elevations at the Application Site. Therefore, the risk of fluvial flooding along the Ballivor River, located to the east of the Application Site, backing up into the site drainage network is very low.

The main risk of flooding across much of the Application Site is via pluvial flooding due to the low permeability peat soils and subsoils. The surface of the cutover bog contains an extensive network of peat drains with surface water outflows from the bogs. This existing drainage network has reduced the risk of pluvial flooding across much of the Application Site. However, following periods of intense and prolonged rainfall events localised surface water ponding still could occur in places. Flood modelling of Ballivor, Bracklin West, and Carranstown bogs have been completed by the Applicant (2020). That study indicates there is significant storage within each of the bog basins to alleviate any flood risk associated with pluvial flooding. The risk of flooding is addressed further in Chapter 8: Hydrology and Hydrogeology and Appendix 8-1 Flood Risk Assessment.

5.5.5.3 Peat Landslide

Geological Survey Ireland (GSI) does not have any records of historic landslides within the Application Site or in the surrounding lands from 1988 to present day. The closest recorded landslide event (1999) is mapped at Girley Bog, Chamberlainstown, approximately 12km northeast of Lisclogher Bog. Girley Bog is classed as a raised intact bog. "No apparent Impact" is recorded for this event.

A peat stability assessment was carried out for the Application Site as part of the proposed Ballivor Wind Farm (Ref. PA25M.316212) application which has been appended as part of this rEIAR as Appendix 7-1 Peat Stability Assessment. Please see Chapter 7 Land Soil and Geology for further details.

5.6 Likely Significant Effects and Associated Mitigation Measures

5.6.1 Do-Nothing Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently. other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to the Applicant in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the "do nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of the Applicant's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of the Applicant 's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

5.6.2 Peat Extraction Phase (July 1988 - June 2020)

5.6.2.1 Land Use

Identification and Description of Impact

The Application Site was subject to industrial peat extraction activities and all ancillary works from July 1988 to June 2020. Installation of drains and clearance of vegetation was undertaken at the Ballivor, Carranstown, Bracklin, Lisclogher-West and Lisclogher Bog Groups, with most of the drainage already being inserted by 1988. Permanent railway lines were laid down and peat extraction was underway on each of the bog units except Lisclogher West by 1988.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long-term, significant, negative effect on land use.

Control Measures

Control measures were in place at the Application Site under the IPC Licence which came into effect from 2000 onwards. The following control measure is relevant in terms of land use:

> *Condition 4*
>
> *4.1 The license shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following: 4.1.3 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.*

Residual Effect

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long-term, significant, negative residual effect on land use.

Significance of Effects

Based on the assessment above, there were significant direct effects on land use during the Peat Extraction Phase.

5.6.2.2 Population

Identification and Description of Impact

The initial attraction of settlers to the area in the 1940s and 1950s for long term employment is considered to have created a boost to population levels. Ongoing peat extraction activities and all ancillary works facilitated a stabilisation of population due to employment opportunities and the corresponding development of services.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long-term, slight, positive effect on population.

Control Measures

No control measures were undertaken.

Residual Effect

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long-term, slight, positive residual effect on population.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on population during the Peat Extraction Phase.

5.6.2.2.2 *Employment and Economic Activity*

Identification and Description of Impact

As discussed, the Applicant has been the leading commercial employer for rural communities of the Midlands of Ireland since the late 1950s, employing thousands of workers permanently throughout the decades, both directly in the peat extraction industry and indirectly, through the horticultural industry. The decades long peat extraction activities and all ancillary works undertaken at the Application Site had a long term, significant, positive effect on employment and economic activity during the Peat Extraction Phase. Employment numbers at the Application Site leading up to the permanent cessation of activities were significantly lower than in 1988, as discussed in section 5.4.1.2. Since 2000, continuous environmental monitoring and maintenance has been undertaken as required under the IPC Licence P0501-01, which has required staff to complete and has thus contributed to employment levels. the Applicant provided ongoing, albeit limited, employment through the extraction of peat until June 2020 and removal of stockpiles from the bogs up to the end of 2023.

Control Measures

When peat extraction activities and all ancillary works ceased in June 2020, where possible, the Applicant provided retraining to employees at the Application Site and provided employment in other Bord na Móna departments and locations. Additionally, in the planning of the cessation of peat extraction across the Bord na Móna landbank, strategies such as the Brown to Green strategy, which involves the transformation of the Applicant from a traditional peat business into a climate solutions company, were being devised. This strategy aimed to facilitate the transition from peat-based activities into opportunities in the Applicant's green businesses and peatland rehabilitation activities, and in doing so, to provide replacement and new employment opportunities.

Residual Effect

The decades long peat extraction activities and all ancillary works undertaken at the Application Site had a long term, significant, positive residual effect on the local economy by supporting employment directly to the local community, the rural Midlands, and the Nation as a whole. The decrease in employment at the Application Site due to advances in mechanisation and technology, creation of autonomous work groups and redundancies across the Applicant's peat bog sites in recent decades, has had a long-term, moderate, negative residual effect on employment local community, the rural Midlands, and the Nation as a whole during this period.

Significance of Effects

Based on the assessment above, there was significant direct effects on employment and economic activity during the Peat Extraction Phase.

5.6.2.2.3 *Access & Transport*

Identification and Description of Impact

Peat extraction activities and all ancillary works at the Application Site would have generated additional traffic onto public roads through the delivery of peat from the Application Site to various end users around the country. Vehicles transporting peat had the potential to emit dust and soil roads. Rail passings of laden and unladen wagons were required to cross the public road network potentially impacting traffic flow and could have caused accidents. An impact assessment of the additional traffic generated by the Applicant in the transportation of peat from the Application Site to various end users around the country is assessed discussed in Chapter 14 Material Assets.

The addition of traffic on the road and potential for traffic disruption due to rail car passings during the Peat Extraction Phase is considered to have had a long term, slight, negative effect.

Dust and CO_2 emissions as well as Noise and Vibration emissions generated by deliveries and from the onsite railway infrastructure are assessed Chapter 9 Air Quality, Chapter 10 Climate, Chapter 11 Noise and Vibration, Chapter 14 Material Assets, and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

Control Measures

Control measures implemented at the site prior to 1988 which are still in force today are as follows:

1. *All machinery including road vehicles were regularly inspected, serviced. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release;*
2. *Clean road crossings to ensure no peat was tracked across public roads;*
3. *All vehicles utilise the wheel wash prior to entering the local road network;*
4. *Road transported peat is adequately covered (sheeted or similar);*
5. *Transportation of peat is undertaken outside peak travel hours;*
6. *Railway tracks and railway locomotives underwent continuous inspection and maintenance to prevent de-railments, fires, accidents and fuel leaks;*
7. *The locomotives are fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel; and*
8. *Wagons are also designate as fire safety wagons and are stocked with various fire safety paraphernalia including hoses, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers.*

Residual Effect

The addition of traffic on the road and potential for traffic disruption due to rail car passings during the Peat Extraction Phase is considered to have had a long term, imperceptible, negative residual effect.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on access and transport during the Peat Extraction Phase.

5.6.2.2.4 *Housing*

Identification and Description of Impact

The Applicant directly contributed to the quantum of housing in the local area by constructing 9. no houses in Ballivor Village in 1956 for employees at Application Site and further housing was built by the Applicant all over Counties Meath and Westmeath as indicated in section 5.4.5 above. These houses were still occupied in 2020 by private owners. Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long-term, moderate, positive effect on housing.

Control Measures

No control measures were undertaken.

Residual Effect

The industrial peat extraction activities and all ancillary works initially had a long term, moderate, positive residual effect on housing but in recent years no impact on existing housing levels would have occurred.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on housing during the Peat Extraction Phase.

5.6.2.3 Human Health

5.6.2.3.1 *Air Quality & Climate- Dust, NO2, PM10, PM2.5 and CO2 Emissions*

Identification and Description of Impact

Peat extraction activities and all ancillary works would have generated dust impacts at nearby properties within the Study Area. The milling, harrowing, ridging and harvesting processes would have generated some dust emissions. Dust impacts would have typically occurred within 250m of the Application Site with the majority of deposition occurring within the first 50m. Dust deposition monitoring carried out on the Application Site and reported within the AERs (Appendix 4-3) indicated that there have been zero complaints in relation to dust emissions and only one non-compliance event (in 2007) over the period 2007 – 2022.

Long-term monitoring of NO_2, PM_{10} and PM_{25} at nearby monitoring stations or comparative locations indicate there were no exceedances to the daily or annual thresholds of NO_2, PM_{10} and $PM_{2.5}$. Please see Chapter 9 Air Quality for details. A total of 2,703,053 tCO_2 was directly or indirectly removed over the 1988 – 2020 period through peat extraction activities and all ancillary works. Please see Chapter 10 Climate for details. Over this 33-year period there was on average 81,911 tonnes of CO_2 per annum removed from the Ballivor, Bracklin, Carranstown and Lisclogher bogs. Annually this equates to 0.03% of Ireland's 2021 – 2025 carbon budget of 295 $MtCO_2e$ or 0.05% of Ireland's more stringent 2030 – 2035 carbon budget of 151 $MtCO_2e$.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a permanent, moderate, negative effect on air quality and climate.

Control Measures

Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. The following measures were undertaken as part of general site management and daily operation procedures at the Application Site from the onset of extraction in the 1950s to the cessation in 2020.

- Stockpiles were compacted on either side by large rollers drawn by tractors;
- Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
- Extraction was avoided during windy weather;
- Headlands were kept clean and loose peat removed;
- Driving speeds were kept slow along dusty headlands; and,
- Road crossings were kept clean.

Further to the above, since 2000, monitoring for dust deposition has been undertaken at the Application Site as a requirement of Condition 5 of the IPC Licence for the site.

Condition 5 Emissions to Air:

Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].

In relation to Dust Control the licensee shall, within six months of date of grant of this licence, develop and implement procedures to ensure that:

- *shelter belts are planted in sensitive areas,*
- *harvesting in sensitive areas is avoided during windy weather,*
- *where possible machinery use grassed pathways,*
- *headlands are kept clean and free of excessive loose peat,*
- *stockpiles are sheeted where possible,*
- *moving machinery maintains slow speeds when travelling along dusty headlands,*
- *when harvesting, the jib is maintained low to the stockpile,*
- *shelter belts are planted around outloading facilities,*
- *road transported peat is adequately covered (sheeted or similar),*
- *wind breaks are planted where-ever possible.*

No further control measures were undertaken.

Residual Effect

Given the extensive control measures carried out at the Application Site prior to the IPC Licence combined with the dust monitoring and condition compliance since 2000, it is considered that dust emissions from the peat extraction activities and all ancillary works and related activities had a localised long-term, negative imperceptible impact on air quality.

Emissions of NO_2, PM_{10} and PM_{25} generated from the peat extraction activities and all ancillary works activities had a localised long-term, negative imperceptible residual effect on air quality. Please see Chapter 9 Air Quality for further details.

The removal of the carbon sink potential of the site and the subsequent release of CO_2 from the peat extraction activities and all ancillary works activities resulted in a long-term, negative significant residual effect on climate. Please see Chapter 10 Climate for further details.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on air quality during the Peat Extraction Phase. There was a significant effect on climate during the Peat Extraction Phase.

5.6.2.3.2 *Water Quality*

Identification and Description of Impact

The potential for the peat extraction activities and all ancillary works to impact the hydrogeology of the Ballivor Public Water Supply is low as the bog drainage regime was already largely in place at the time the source boreholes were drilled (1994). The natural hydrological and hydrogeological regime of peat bogs, with little groundwater recharge and high runoff rates, also limit the potential effects that peat extraction activities and all ancillary works may have had on local groundwater abstractions including the Ballivor Public Water Supply.

Impacts from the accidental spillage of petroleum hydrocarbons during refuelling of machinery and the accumulation of small spills of fuels and lubricants during routine plant use can have a significant effect on the geological and water environment which can in turn be harmful to human health. Please see Chapter 8 Hydrology and Hydrogeology for details.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, imperceptible, negative effect on water quality.

Control Measures

No control measures to minimise impacts on the public water supply would have been necessary due to the shallow nature of the works and the nature of the local hydrogeological regime.

In the period between 1988 and 2000 (i.e. before the IPC Licence took effect at the Application Site), control measures had been adopted by the Applicant to protect water quality. These measures related to machinery maintenance and storage, refuelling facilities, surface water management, a maintenance programme for internal drains, maintenance of onsite water pumps, and silt management; these measures have been outlined in Sections 4.3.5.1 to 4.3.5.9 of Chapter 4. Since 2000, the Application Site has been operated under IPC Licence and a Surface Water Management Plan. Furthermore, no reports of leaks, spills or contamination has been reported since the commencement of Annual Environmental Reporting to the EPA. Please see please see Chapter 8 Hydrology and Hydrogeology for further details.

Residual Effect

The Application Site is not located within the mapped SPA of the Ballivor Public Water Supply.

Due to the Application Site's compliance with conditions set out in the licence pertaining to emissions to water, there has not been a significant effect on downstream surface water or ground water quality as a result of leaks and spills during the peat extraction phase of the project.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, imperceptible, negative residual effect on water quality.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on water quality during the Peat Extraction Phase.

5.6.2.3.3 *Noise*

Identification and Description of Impact

As discussed, potential noise impacts from plant and equipment would have been experienced intermittently during active periods of peat extraction due to the continuous movement of machinery around the bogs, i.e., no machinery operated continuously in the one location near sensitive receptors. As peat extraction activities wound down at the Application Site, the potential for noise impacts decreased. Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, slight, negative effect on noise.

Control Measures

Prior to 2000, control measures pertaining to noise comprised of machinery maintenance:

1. *All peat harvesting machinery listed above in section 4.2.4 were stored at the Ballivor Works at the end of the workday.*
2. *All machinery were regularly inspected, serviced.*
3. *Railway tracks and railway locomotives underwent continuous inspection and maintenance*

Since 2000, Application Site has been operating under IPC Licence control and a noise limit, detailed in section 5.5.3 above, has been set for the activities on site**.** As peat extraction was underway across all bogs except Lisclogher West in the early 2000s, it is considered, similar noise emissions would have occurred from 1988 to 2000. Any incidents of noise exceedances and noise complaints must be included in the AERs. There have been no incidents of noise exceedances or noise-related complaints at the site since the onset of the IPC Licence requirements in 2000.

Residual Effect

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, slight, negative residual effect on noise.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on noise during the Peat Extraction Phase.

5.6.2.3.4 *Health and Safety*

Identification and Description of Impact

The Application Site was under operation as an industrial peat extraction site, which necessitated the use of machinery, and incurred travel on the local public road network to and from the Application Site. Peat extraction sites and the machinery used on them pose a potential health and safety hazard to workers if site rules are not properly adhered to.

There was potential for bog fires occurring due to inappropriate on-site bog management, via external sources and through natural events caused by dry weather. Storage of potential sources of pollution on

site, such as bulk storage of hydrocarbons or chemicals, storage of wastes, had the potential to cause significant environmental pollution and associated negative effects on health. Workplace accidents could occur in industrial, large-scale settings.

Bog fires have occurred during dry summer periods and, as a condition of the IPC Licence, are reported to the EPA in the Annual Environmental Reports.

Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc are subject to the conditions of the IPC Licence. Please see Appendix 4-1 for details.

The sites are not connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO sites, and so there is no potential effects from this source.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, slight, negative effect on health and safety.

Control Measures

The Applicant has long been a cognisant of Health and Safety. Following a number of explosions in Lullymore Briquette Factory in the late 1940s and early 1950s[11], the comprehensive scheme for accident prevention was devised[12]. In 1958, a permanent committee was established within Bord na Móna to administer accident prevention schemes. Each Works site had a first aid team consisting of trained volunteers who partook in regular training and administered first aid as required during operations. In 1981, a new safety policy was adopted across the company. Health and Safety has been an evolving field since 1988, with improvements being made to the Applicant's health and safety policies over the years. This has been aided by the introduction of Safety Health & Welfare at Work Act 2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013. The Applicant provides various training to their employees to minimise any negative impacts on health and safety on all of their sites.

The Applicant have produced and implement an annual Health and Safety Statement which aims to:

1. *Comply, as a minimum, with all statutory requirements, common law duties, codes of practice and best industry practice relating to our activities, including the Safety Health & Welfare at Work Act 2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013;*
2. *Provide and maintain a safe and healthy place of work & working conditions, and to develop & maintain safe systems of work;*
3. *Ensure adequate resources, structures and systems to effectively manage workplace safety, health and welfare;*
4. *Identify all workplace hazards, assess the associated risks, implement appropriate control measures, taking account of the principles of prevention, to eliminate where possible or minimise such risks to acceptable levels, and monitor their effectiveness;*
5. *Provide information, instruction and training - in a manner and language understood by the trainee - and supervision to enable employees to perform their work safely and effectively;*
6. *Provide necessary protective equipment and safety devices and supervise their use;*
7. *Protect, as far as is reasonably practicable, persons not employed by the company who may be affected by our activities;*
8. *Ensure contractors and service providers comply with company safety requirements;*

[11] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 84*
[12] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 102*

9. *Strive to continuously improve health and safety management based on performance monitoring and in line with changes in legislation and best practice;*
10. *Build on its safety culture & continue to raise health & safety awareness amongst employees;*
11. *Consult with employees and contractors on matters of health, safety & welfare and take account of representations made by employees on such matters; and*
12. *Review this policy & the safety statement, as per legislative requirements, and to ensure their validity and effectiveness.*

Fire safety and awareness is provided as part of the Applicants general safety induction with reoccurring refresher training every three years. Please see Appendix 5-1 Fire Prevention & Fire Fighting Procedures for Peat Production Bogs for further details.

Condition 13 of the IPC Licence states that it is the responsibility of the licence holder (the Applicant) to ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure includes provision for minimising the effects of any emergency on the environment.

Residual Effect

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, imperceptible, negative residual effect on health and safety.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on health and safety during the Peat Extraction Phase.

5.6.2.3.5 *Vulnerability to Natural Disasters*

Identification and Description of Impact

Bog Fires, Landslides and Flooding

As discussed in Section 5.5.5, the types of natural disasters that could occur at the Application Site are bog fires, landslides and flooding events.

A bog fire occurred at Lisclogher West and Lisclogher bogs in 2008. This fire occurred due to dry weather conditions. In both cases, the EPA was contacted, and corrective measures were put in place and the fires were brought under control. No Bord na Móna staff or third parties were involved in the outbreak of the fire and the fires were contained by Bord na Móna staff within the Application Site boundary.

The closest recorded landslide event (1999) is mapped at Girley Bog, Chamberlainstown, approximately 12km northeast of Lisclogher Bog. Girley Bog is classed as a raised intact bog. “No apparent Impact” is recorded for this event.

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring at Application Site as Low. This is due to the sites relatively flat topography.

Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a potential long term, moderate, negative effect on the Project’s vulnerability to natural disasters.

For full details on the vulnerability of the Project to major accidents and natural disasters, please see Chapter 15 of this rEIAR.

Control Measures

Control measures implemented at the Application Site are detailed in Appendix 5-1 Fire Prevention and Fire Fighting Procedures for Peat Production Bogs and Appendix 5-2 Bord na Móna Health and Safety Statement.

Residual Effect

Due to the comprehensive fire management and training procedures implemented at the Application Site, the potential for internal source fires were very low. There was one recorded bog fire at the Application Site in 2008. Due to the flat topography of the Application Site, the possibility of a landslides was and are considered low. The potential for flooding at the Application Site was and is also considered low.

As such, ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, slight, negative residual effect on human health and those residing in the surrounding landscape due to the potential for natural disasters at the Application Site.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on the vulnerability of the Project to natural disasters during the Peat Extraction Phase.

5.6.3 Current Phase (June 2020 to Present Day)

5.6.3.1 Land Use

Identification and Description of Impact

Peat extraction activities and all ancillary works ceased at the Application Site in June 2020, therefore no peat extraction works are occurring at the Application Site during the Current Phase. Cutaway Bog Decommissioning and Rehabilitation Plans are being drafted and implemented as required (see Appendix 4-2).

The cessation of peat extraction activities and all ancillary works during the Current Phase have resulted in a short-term, moderate, positive effect on land use.

Control Measures

Control measures were in place at the Application Site under the IPC Licence which came into effect from 2000 onwards. The following control measure is relevant in terms of land use for the Current Phase:

> *Condition 4*
>
> *4.1 The license shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:4.1.3 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.*
>
> *Condition 10*

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

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

10.1.2 Implement the agreed cutaway bog rehabilitation plan.

Residual Effect

Since the cessation of peat extraction activities and all ancillary works in June 2020, it is considered that there has been a short-term, moderate, positive residual effect on land use.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on land use during the Current Phase.

5.6.3.2 Population

Identification and Description of Impact

The initial attraction of settlers to the area in the 1940s and 1950s for long term industrial-scale employment resulted in a generational increase in population levels over the decades. The cessation of peat extraction activities and all ancillary works during the Current Phase have resulted in a short-term, imperceptible, neutral effect on population.

Control Measures

No control measures are proposed.

Residual Effect

The cessation of peat extraction, and continuation of all other activities during the Current Phase have resulted in a short-term, imperceptible, neutral residual effect on population.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on population during the Current Phase.

5.6.3.2.2 *Employment and Economic Activity*

Identification and Description of Impact

Peat extraction ceased at the Application Site in June 2020 and all existing stockpiles of peat were removed off the bogs by the end of 2023. The Applicant still provides employment at the Application Site through environmental monitoring and maintenance as required under the IPC Licence P0501-01 and through the Peatland Climate Action Scheme (PCAS). Please see Chapter 4 for details.

The cessation of peat extraction activities and all ancillary works during the Current Phase have resulted in a short-term, slight, negative effect on employment and economic activity.

Control Measures

No control measures are proposed for the current phase.

Residual Effect

The cessation of peat extraction in June 2020, has had a short-term, slight, negative residual effect on employment and economic activity in the local community and the rural Midlands.

However, where possible, the Applicant has redeployed and retrained peat extraction employees in other sectors in its *Brown to Green* transition, thus minimising job loss within the company. The Applicant has created jobs through the development of climate solutions on its vast land banks, such as renewable energy. One such example is the potential development of the proposed Ballivor Wind Farm (Ref. PA25M.316212) which is estimated to create between 100-120 jobs at peak construction, 2-3 permanent jobs for the operational lifetime and 20-40 jobs during its decommissioning phase.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on employment and economic activity during the Current Phase.

5.6.3.2.3 *Access & Transport*

Identification and Description of Impact

Traffic movements to and from the Application Site are considerably lower than during the Peat Extraction Phase and are limited to personal vehicles arriving and departing the Application Site and occasional tractor and excavator plant required to undertake works on the Application Site in line with IPC Licence and Peatland Climate Action Scheme (PCAS) requirements. There is approximately one rail movement across the Application Site per week for maintenance purposes. The cessation of peat extraction activities at the onset of the Current Phase has resulted in a short-term, imperceptible, negative effect on access and transport.

Control Measures

Control measures implemented at the Application Site prior to June 2020 which are still in force today, where relevant, are as follows:

1. *All machinery including road vehicles were regularly inspected, serviced. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release;*
2. *Clean road crossings to ensure no peat was tracked across public roads;*
3. *All vehicles utilise the wheel wash prior to entering the local road network;*
4. *Road-transported peat is adequately covered (sheeted or similar); and*
5. *Transportation of peat is undertaken outside peak travel hours.*

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on access and transport.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on access and transport during the Current Phase.

5.6.3.2.4 *Housing*

Identification and Description of Impact

As discussed in Section 5.4.5 above, the Applicant constructed housing for its employees in Counties Meath and Westmeath. These houses are still occupied during the present day during the Current Phase by private landowners.

The cessation of peat extraction activities and all ancillary works during the Current Phase have resulted in a short-term, imperceptible, positive effect on housing.

Control Measures

No control measures are proposed.

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, positive residual effect on housing.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on housing during the Current Phase.

5.6.3.3 Human Health

5.6.3.3.1 *Air Quality & Climate - Dust, NO_2, PM_{10} and PM_{25}, CO_2*

Identification and Description of Impact

Emissions of dust and air pollutants have decreased significantly over the years due to the winding down of peat extraction at the Application Site. As discussed above, emissions during the Peat Extraction Phase were not considered significant and no breaches of emissions limits occurred, or complaints were received. Since the cessation of peat extraction at the onset of the Current Phase, emissions are considered to be significantly less than during the Peat Extraction Phase. As such, effects on air quality and climate during the Current Phase are considered to be short-term, imperceptible and negative.

Control Measures

The following measures are undertaken as part of general site management and daily operation procedures at the Application Site since June 2020.

- Up until the removal of stockpiles from the Application Site by the end of 2023, stockpiles were compacted on either side by large rollers drawn by tractors;

- Up until the removal of stockpiles from the Application Site by the end of 2023, stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
- Headlands were kept clean and loose peat removed;
- Driving speeds were kept slow along dusty headlands; and,
- Road crossings were kept clean.

In addition to the above, drain blocking as part of PCAS is underway at Carranstown, Lisclogher West and Bracklin West. Please see Chapter 4 for details on the Peatland Climate Action Scheme (PCAS).

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on air quality and climate.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on air quality and climate during the Current Phase.

5.6.3.3.2 *Water Quality*

Identification and Description of Impact

There is potential for impacts on groundwater and surface water through accidental leaks and spills of hydrocarbons during the refuelling process, despite the limited activity at the Application Site during the Current Phase. Similarly, discharges from the Ballivor Works and welfare facilities have the potential to cause surface water and groundwater contamination.

No effect on local groundwater abstractions will have occurred since the cessation of peat extraction in June 2020 to the present day. Drainage and hydrogeology of the Application Site are unchanged during this period.

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative effect on water quality.

Control Measures

Any works during this time period have been completed under IPC Licence from the EPA, and Bord na Mona's Environmental Management System. Since 2000 the Application Site has been compliant with the conditions set out in the IPC Licence.

Since 2000, the Application Site has been regulated by the EPA under IPC Licence and a Surface Water Management Plan. Furthermore, no reports of leaks, spills or contamination has been reported since the commencement of Annual Environmental Reporting to the EPA. Please see please see Chapter 8 Hydrology and Hydrogeology for further details.

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on water quality.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on water quality during the Current Phase.

5.6.3.3.3 *Noise*

Identification and Description of Impact

The Current Phase involves the continuous environmental maintenance and monitoring, and the intermittent use of tractors and excavators to facilitate drain maintenance. The potential for noise impacts is considerably reduced in comparison to the Peat Extraction Phase.

Control Measures

The Application Site operates under IPC Licence conditions, detailed in Section 5.5.3 above. There have been no incidents of noise exceedances or noise related complaints at the Application Site since the granting of the IPC Licence in 2000.

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on noise.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on noise during the Current Phase.

5.6.3.3.4 *Health and Safety*

Identification and Description of Impact

The emergency response procedures detailed in Appendix 5-2 Bord na Mona Health and Safety Statement are still implemented at the Application Site today. Since peat extraction has ceased and activity levels at the Application Site have reduced considerably since June 2020, it is considered that the potential for health and safety incidents on the Application Site are reduced when compared to the Peat Extraction Phase.

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, slight, neutral effect on health and safety.

Control Measures

Control measures undertaken during the Peat Extraction Phase (as outlined in Section 5.6.2.3.4) and detailed in Appendix 5-2 Bord na Móna Health and Safety Statement are still in operation at the site.

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on health and safety.

Significance of Effects

Based on the assessment above, there are no significant direct or indirect effects on health and safety during the Current Phase.

5.6.3.3.5 *Vulnerability to Natural Disasters*

Identification and Description of Impact

Bog Fires, Landslides and Flooding

No peat extraction has occurred at the Application Site since June 2020. Therefore, no significant change in topography and/or drainage has occurred during the Current Phase. The risk of peat failure at the site remains low. Since the cessation of peat extraction, the frequency of refuelling activities has decreased significantly. As such, the potential for internal source fires has also decreased. The potential for bog fires due to dry weather conditions remains, but this occurrence is rare. Drainage works on site are continuously maintained and inspected by onsite staff. There has been no recorded floods or landslides since the onset of activities in the 1940s

A Peat Stability Assessment was undertaken at the site in 2021 by Fehily Timoney to assess the susceptibility of the site to peat failure following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, Scottish Government, 2017). The findings, which involved analysis of approximately 300 locations, show that the Application Site has an acceptable margin of safety with regard peat stability. Slope inclinations across the Application Site range from 2 to 4 degrees and therefore, the flat topography/nature of the terrain on site reflects the low risk of peat failure.

The Peat Stability Assessment concluded that the stability i.e., Factor of Safety (FoS), of the peat slopes for the site has an acceptable value of 1.3 (FoS of less than 1.0 indicates an unstable slope and a FoS of greater than 1.0 indicating a stable slope).

Control Measures

Control measures implemented at the site are detailed in Appendix 5-1 Fire Prevention and Fire Fighting Procedures for Peat Production Bogs and Appendix 5-2 Bord na Móna Health and Safety Statement.

Residual Effect

The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on the Project's vulnerability to natural disasters. For full details on the vulnerability of the Project to natural disasters, please see Chapter 15 of this rEIAR.

Significance of Effects

Based on the assessment above, there was no significant direct or indirect effects on the vulnerability of the Project to natural disasters during the Current Phase.

5.6.4 Remedial Phase

5.6.4.1 Land Use

Identification and Description of Impact

The Remedial Phase of the Project involves the implementation of Cutaway Bog Decommissioning and Rehabilitation Plans as per Condition 10 of the IPC Licence. Mitigation Measures

Mitigation measures at the Application Site for the Remedial Phase are included under the IPC Licence which came into effect from 2000 onwards. The following mitigation measure is relevant in terms of land use for the Remedial Phase:

> *Condition 10*
>
> *10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:*
>
> *10.1.2 Implement the agreed cutaway bog rehabilitation plan.*

Residual Effect

Bog rehabilitation during the Remedial Phase will have a long term, significant, positive effect on land use at the Application Site. The bog-specific Cutaway Bog Decommissioning and Rehabilitation Plans are provided in Appendix 4-2.

Significance of Effects

Based on the assessment above, there will be significant direct effects on land use during the Remedial Phase.

5.6.4.2 Population

Identification and Description of Impact

The Remedial Phase will involve the implementation of Cutaway Bog and Decommissioning and Rehabilitation Plans at the Application Site. Therefore, bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, neutral effect on population.

Mitigation Measures

No mitigation measures are proposed.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, neutral residual effect on population.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on population during the Remedial Phase.

5.6.4.2.2 *Employment and Economic Activity*

Identification and Description of Impact

The implementation of the Cutaway Bog and Decommissioning and Rehabilitation Plans at the Application Site will require 3-4 no. staff for the first two years followed by 1-2 no. staff visiting monthly over 30 years.

As such, bog rehabilitation during the Remedial Phase will result in a long term, slight, positive effect on employment and economic activity.

Mitigation Measures

No mitigation measures are proposed.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, slight, positive residual effect on employment and economic activity.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on employment and economic activity during the Remedial Phase.

5.6.4.2.3 *Access & Transport*

Identification and Description of Impact

The Remedial Phase will involve lights good vehicle movements to and from the Application Site as personnel travel to and from the Application Site for work.

As such, bog rehabilitation during the Remedial Phase will result in a short term, negative, imperceptible residual effect on access and transport.

Mitigation Measures

The following mitigation measures will be implemented at the Application Site during the Remedial Phase:

1. *All HGVs used on site will undergo regular inspection and maintenance checks.*
2. *All HGVs used on site will undergo wheel washing prior to crossing the local road network to access other bogs or return to the Ballivor Works for storage.*
3. *Only HGV licence holders operated the HGVs and will undergo regular re-training on HGV safety operations and vehicle maintenance.*
4. *Refuelling of all HGV vehicles was undertaken at the Ballivor Works only.*
1. *Machinery crossing points on local roads between bogs were cleaned down at the end of each working day.*

2. *Car sharing by personnel and bike to work schemes will be encouraged. As part of Bord na Móna's vision for a climate neutral Ireland by 2050, the applicant encourages and promotes car sharing and cycle to work schemes where possible for its personnel.*

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a short term, negative, imperceptible, residual effect access and transport.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on access and transport during the Remedial Phase.

5.6.4.2.4 *Housing*

Identification and Description of Impact

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, neutral effect on housing.

Mitigation Measures

No mitigation measures are proposed.

Residual Effect

The implementation of the Cutaway Bog and Decommissioning and Rehabilitation Plans is not considered to have an impact on housing.

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, neutral residual effect on housing.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on housing during the Remedial Phase.

5.6.4.3 Human Health

5.6.4.3.1 *Air Quality & Climate: Dust, NO_2, PM_{10} and $PM_{2.5}$, CO_2*

Identification and Description of Impact

The implementation of Cutaway Bog and Decommissioning and Rehabilitation Plans will involve limited machinery onsite to carry out drain blocking. Therefore, bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, negative effect on air quality and climate.

Mitigation Measures

Control measures that are currently in operation at the Application Site will continue during the Remedial Phase. Monitoring that is taking place under IPC Licence will continue during the Remedial Phase.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, neutral residual effect on air quality and climate.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality and climate during the Remedial Phase.

5.6.4.3.2 *Water Quality*

Identification and Description of Impact

The overall aim of the Cutaway Bog and Decommissioning and Rehabilitation Plans is to put the bogs on a trajectory towards becoming naturally functioning peatlands and improve water quality. Following the implementation of the proposed Cutaway Bog and Decommissioning and Rehabilitation Plans, the bogs will be wetter, retain more water, re-colonise with vegetation slowly, and they will eventually become naturally functioning peatlands with much-reduced silt and nutrient output. Therefore, bog rehabilitation during the Remedial Phase will result in a long term, slight, positive effect on water quality.

Mitigation Measures

Any works undertaken as part of the Cutaway Bog and Decommissioning and Rehabilitation Plans will be completed under IPC Licence, with the Applicant reporting to the EPA until the IPC Licence is surrendered. The existing key drainage systems which have proven effective will continue to operate as required during this period. The Cutaway Bog Decommissioning and Rehabilitation Plans state that the effects of any management activities will be monitored and assessed.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, slight, positive residual effect on water quality.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on water quality during the Remedial Phase.

5.6.4.3.3 *Noise*

Identification and Description of Impact

There will be limited machinery on the Application Site to carry out works required as part of the Cutaway Bog Decommissioning and Rehabilitation Plans during the Remedial Phase.

Mitigation Measures

Noise limits included under the IPC Licence, detailed in Section 5.5.3 above, will still be complied for future rehabilitation activities as part of the Remedial Phase.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, negative residual effect on noise.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on noise during the Remedial Phase.

5.6.4.3.4 *Health and Safety*

Identification and Description of Impact

The emergency response procedures detailed in Appendix 5-2 Bord na Mona Health and Safety Statement will continue to be implemented at the Application Site during the Remedial Phase. It is considered that the potential for health and safety incidents at the Application Site will be unlikely due to the limited amount of activity involved during rehabilitation works during the Remedial Phase. There will be limited machinery on site to undertake rehabilitation works, which minimises the risk of the occurrence of health and safety incidents further.

Mitigation Measures

Control measures undertaken during the Peat Extraction Phase (as outlined in Section 5.6.2.3.4) and detailed in Appendix 5-2 Bord na Móna Health and Safety Statement are still in operation at the site.

Residual Effect

Bog rehabilitation during the Remedial Phase will result in a long term, imperceptible, negative residual effect on health and safety.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on health and safety during the Remedial Phase.

5.6.4.3.5 *Vulnerability to Natural Disasters*

Identification and Description of Impact

The risk of peat failure at the Application Site remains very low during the Remedial Phase. The potential for bog fires which may be caused by rehabilitation works during the Remedial Phase is very low. Given the limited ground disturbance and limited use of machinery during the Remedial Phase, landslides and flooding are not foreseen at the Application Site.

For full details on the vulnerability of the Application Site during the Remedial Phase to major accidents and natural disasters, please see Chapter 15 of this rEIAR.

Mitigation Measures

Mitigation measures listed in Appendix 5-2 Bord na Mona Health and Safety Statement will be implemented during the Remedial Phase.

Residual Effect

The low potential for natural disasters combined with the low levels of activities proposed in for the Remedial Phase are considered to have a long-term imperceptible negative residual effect on health and safety.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on the vulnerability of the Project to natural disasters during the Remedial Phase.

5.7 Cumulative and In-Combination Effects

5.7.1 Peat Extraction Phase: July 1988 - June 2020

The potential cumulative and in-combination effects of the peat extraction activities and all ancillary works at the Application Site with other relevant activities/projects from 1988 to 2020 are considered below. Further information on activities or developments as part of the cumulative assessment are given in Chapter 2: Background.

Employment, Population levels, Housing and Services

It has been established that the Applicant was one of the State's largest commercial employers in 1988 providing permanent and consistent employment in the peat extraction industry. Other projects and activities as described in the cumulative assessment in Chapter 2 of this rEIAR would also have had the potential to provide employment from 1988 to 2020; however, there were no other largescale commercial employers in the surrounding landscape for this period. The development of the peat extraction industry at the Application Site historically attracted settlers to the area. The onset of industrial activities at the Application Site facilitated the development and expansion of services and amenities in the area as well as the increase in residential dwellings. The Applicant also provided housing for employees. Other projects and activities as described in the cumulative assessment in Chapter 2 of this rEIAR would also have had the potential to attracted further settlers, services and amenities to the local area. Therefore, it is considered there was a slight positive cumulative and in combination effect on employment, population levels, housing and services particularly in the 1980s and 1990s. In more recent years as the peat extraction industry became more mechanised, employment levels at the Application Site decreased. However, redeployment to other sectors and retraining was common at Bord na Móna. Therefore, the cumulative and in combination effect on the employment in the area, is considered to have had a slight negative effect in comparison to the 1980s and 1990s due to the lower number of employees at the Application Site prior to the complete cessation of activities.

The period of peat extraction activities which took place at the Application Site before 1988 are also considered as part of the cumulative assessment. During this period, peat extraction commenced and employment numbers (and corresponding population levels, housing and services) in the area rose as the level of peat extraction increased. The annual average volume of peat extracted during the 1954 to 1988 period was 46,843 tonnes. This level of annual average peat extraction is lower than the 1988 to 2020 period, for which the average annual peat extraction volume is 73,972. It is assumed that the level and efficiency of mechanisation was lower in period of peat extraction activities before 1988 when compared to the Peat Extraction Phase. The Peat Extraction Phase is temporally distinct from the peat extraction that occurred before 1988. As such there is no potential for a significant negative cumulative impact between these periods. No significant cumulative or in combination effects on population levels, housing or services occurred.

Human Health

The assessment above indicates there were no significant cumulative effects on human health arising due to peat extraction activities and all ancillary works. It is considered that in combination with peat extraction during the period before 1988 and small-scale projects as listed in Chapter 2, no cumulative or in-combination impacts on human health occurred.

Cumulative and in-combination effects on human health are discussed in further detail in the relevant chapters: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, Chapter 10 Climate, Chapter 11 Noise and Vibration, Chapter 12 Landscape and Visual, Chapter 13 Cultural Heritage, Chapter 14 Material Assets (including Traffic and Transport), and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

5.7.2 Current Phase (June 2020 – Present Day)

The potential cumulative and in-combination effects with other relevant activities/projects with Current Phase activities at the Application Site are considered below. Further information on activities or developments as part of the in-combination assessment are given in Chapter 2: Background.

Employment, Population levels and Services

Other projects and activities as described in the cumulative assessment in Chapter 2 of this rEIAR have had the potential to provide employment and attract settlers and services in the area albeit on a smaller scale. The drop in largescale employment at the Application Site in June 2020 would have had a negative effect on employment in the area. However, where possible, the Applicant have retrained and deployed peat extraction employees to other sectors within the company. Therefore, in combination with small-scale private sector employment in the area a slight negative effect on employment levels are considered for the Current Phase. The assessment above indicates there were no significant cumulative or in-combination effect on population, housing and services in the Current Phase therefore no cumulative or in combination effects are considered.

Human Health

The assessment above indicates there are no significant cumulative effects on human health due to activities associated with the Current Phase. Therefore, there will be no cumulative or in-combination impacts on human health when other small-scale projects and activities in the surrounding landscape are considered.

Cumulative and in-combination effects on human health are discussed in more detail in the relevant chapters: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, Chapter 10 Noise and Vibration, Chapter 12 Landscape and Visual, Chapter 13 Material Assets (including Traffic and Transport) and Chapter 14 Climate.

5.7.3 Remedial Phase

The potential cumulative and in-combination effects of the implementation of the Cutaway Bog and Decommissioning and Rehabilitation Plans and other relevant activities/ projects are considered below. Further information on activities or developments as part of the in-combination assessment are given in Chapter 2: Background.

Employment, Population levels, Housing and Services

There are no significant effects on employment, population levels, housing and services from the Remedial Phase therefore there will be no cumulative or in combination effects when other projects and activities are considered.

Human Health

It is considered that in combination with other small-scale projects as listed in Chapter 2 and the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, there will be no cumulative impacts on human health.

Cumulative and in combination effects on human health are discussed in more detail in the relevant chapters: Chapter 7 Land Soil and Geology, Chapter 8 Hydrology and Hydrogeology, Chapter 9 Air Quality, and Climate, Chapter 10 Noise and Vibration, Chapter 12 Landscape and Visual, Chapter 13 Material Assets (including Traffic and Transport), Chapter 14 Climate and Chapter 15 Vulnerability to Major Accidents and Natural Disasters.

5.7.4 Overall Cumulative Impact Assessment

It is intended to utilise the Application Site for both peatland remediation, wind energy infrastructure and to facilitate environmental stabilisation of the bog group and the optimisation of climate action benefits. The proposed Ballivor Wind Farm is assessed in a separate EIAR with a specific suite of control measures so as to avoid any negative impacts on population and human health. The EIAR, which accompanied a planning application for the proposed Ballivor Wind Farm (PA25M.316212), which was submitted to An Bord Pleanála in April 2023, and details issues related to potential impacts during wind farm construction. The application is currently awaiting decision. The EIAR includes an assessment of the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans in conjunction with the construction, operation and decommissioning of the Ballivor Wind Farm as well as proposed, permitted and operational plans and projects listed in Chapter 2 of its EIAR. The overall permanent footprint of the proposed Ballivor Wind Farm will be less than 1.4% of the total area of the Bog Group, or approx. 1.8% of the Wind Farm Application Site. Therefore, it will not impact or change the overall goals and outcomes of the proposed Cutaway Bog and Decommissioning and Rehabilitation Plans. It is the intention of the Applicant to integrate the peatland remedial measures with the proposed Ballivor Wind Farm. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed wind farm infrastructure. Overall, there are no significant negative cumulative effects when considering past peat extraction activities and all ancillary works and the proposed Ballivor Wind Farm in combination with the proposed Cutaway Bog and Decommissioning and Rehabilitation Plans. Furthermore, cumulative effects when considering the consented Bracklyn Wind Farm (Planning Ref: 311565) and the proposed Knockanarragh Wind Farm located approx. 6km to the north) and any other proposed, permitted or operational plans or projects listed in section 2.6 Chapter 2 of this rEIAR will not occur.

5.8 Conclusion

This chapter of the rEIAR addresses the impacts on population and human health of peat extraction activities and all ancillary works occurring at the Application Site. The assessments in this chapter determined any likely significant effects that occurred on population and human health (or are likely to occur) namely employment, air quality, dust, noxious emissions, water quality, traffic and transport and general health and safety during the Peat Extraction Phase, Current Phase and Remedial Phase. Furthermore, a baseline assessment of population and human health for the year 1988 was carried out supplemented by Central Statistics Office (CSO) data.

The assessment on population considers the current and historical land use of the Application Site, the current activities occurring within and in the vicinity of the Application Site, and their impacts, if any, on local population and employment. The assessment on human health includes literature review of health impact assessment and the EIA process and a review of the past, current and future activities on air quality, dust, noxious emissions, traffic and transport and general health and safety. CSO data has been used to inform the population and human health assessment and identify any impacts that may arise as a result of the Project.

There are no dust, water quality, noxious gas emission data prior to the commencement of the IPC Licence condition compliance requirements in 2000. Since 2000, the Applicant have undertaken annual dust monitoring at the Application Site and there has been only one non-compliance events in relation to dust deposition recorded. The exceedance of the limit value was due to an excavator operating directly adjacent to the dust gauge thereby causing a localised non-compliance event. Furthermore, there have been no third party complaints to excessive dust deposition in the area. Long term monitoring of NO_2, PM_{10} and PM_{25} at nearby monitoring stations or comparative locations indicate there were no exceedances to the daily or annual thresholds of NO_2, PM_{10} and PM_{25} in the atmosphere. Since 2000, the Application Site has been operating under IPC Licence noise limits. There have been no incidents of noise exceedances or noise complaints pertaining to peat extraction activities and all ancillary works at the Application Site since records began.

Peat Extraction Phase (July 1988- June 2020)

The Application Site was subject to ongoing industrial peat extraction activities and all ancillary works from July 1988 to June 2020.

The Applicant has been the leading commercial employer for rural communities of the Midlands of Ireland since the late 1950s, employing thousands of workers permanently throughout the decades, both directly in the peat extraction industry and indirectly, through the horticultural industry. Employment numbers at the Application Site leading up to the permanent cessation of activities were significantly lower than in 1988. Since 2000, continuous environmental monitoring and maintenance has been undertaken as required under the IPC Licence P0501-01 which has contributed to employment levels. The Applicant provided ongoing, albeit limited employment through the extraction of peat until June 2020.

Current Phase (June 2020 – Present)

Peat extraction ceased at the Application Site in June 2020; therefore, no peat extraction works are occurring at the Application Site during the Current Phase. All existing stockpiles of peat were removed off the bogs by the end of 2023. Cutaway Bog Decommissioning and Rehabilitation Plans have been prepared and will be agreed with the EPA before being implemented during the Current Phase.

Where possible, the Applicant has provided retraining to employees at the Application Site and provided employment in other Bord na Móna departments and locations. Additionally, in the planning of the cessation of peat extraction across the Bord na Móna landbank, strategies such as the Brown to Green strategy, which involves the transformation of the Applicant from a traditional peat business into a climate solutions company, were being devised. The Applicant still provides employment at the Application Site through environmental monitoring and maintenance as required under the IPC Licence P0501-01 and through the Peatland Climate Action Scheme (PCAS).

Remedial Phase

The Remedial Phase of the Project involves the implementation of Cutaway Bog Decommissioning and Rehabilitation Plans as per the IPC Licence. The current Cutaway Bog Decommissioning and Rehabilitation Plans are presented in Appendix 4-2. The implementation of the rehabilitation plans will require 3-4 number staff for the first two years followed by 1-2 no. staff visiting monthly over 30 years.

6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) of the peat extraction activities and all ancillary works that took place at Ballivor Bog Group (the Application Site) from July 1988 to the present day on biodiversity. This chapter also assesses the potential impacts on biodiversity of the implementation of the proposed rehabilitation plans for the Ballivor Bog Group, required under Condition 10 of its EPA Licence P0501-01, following the cessation of peat extraction activities in June 2020. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2021 and EU Habitats Directive 92/43/EEC. A full description of all peat extraction activities and all ancillary works is provided in Chapter 4 of this remedial EIAR (rEIAR).

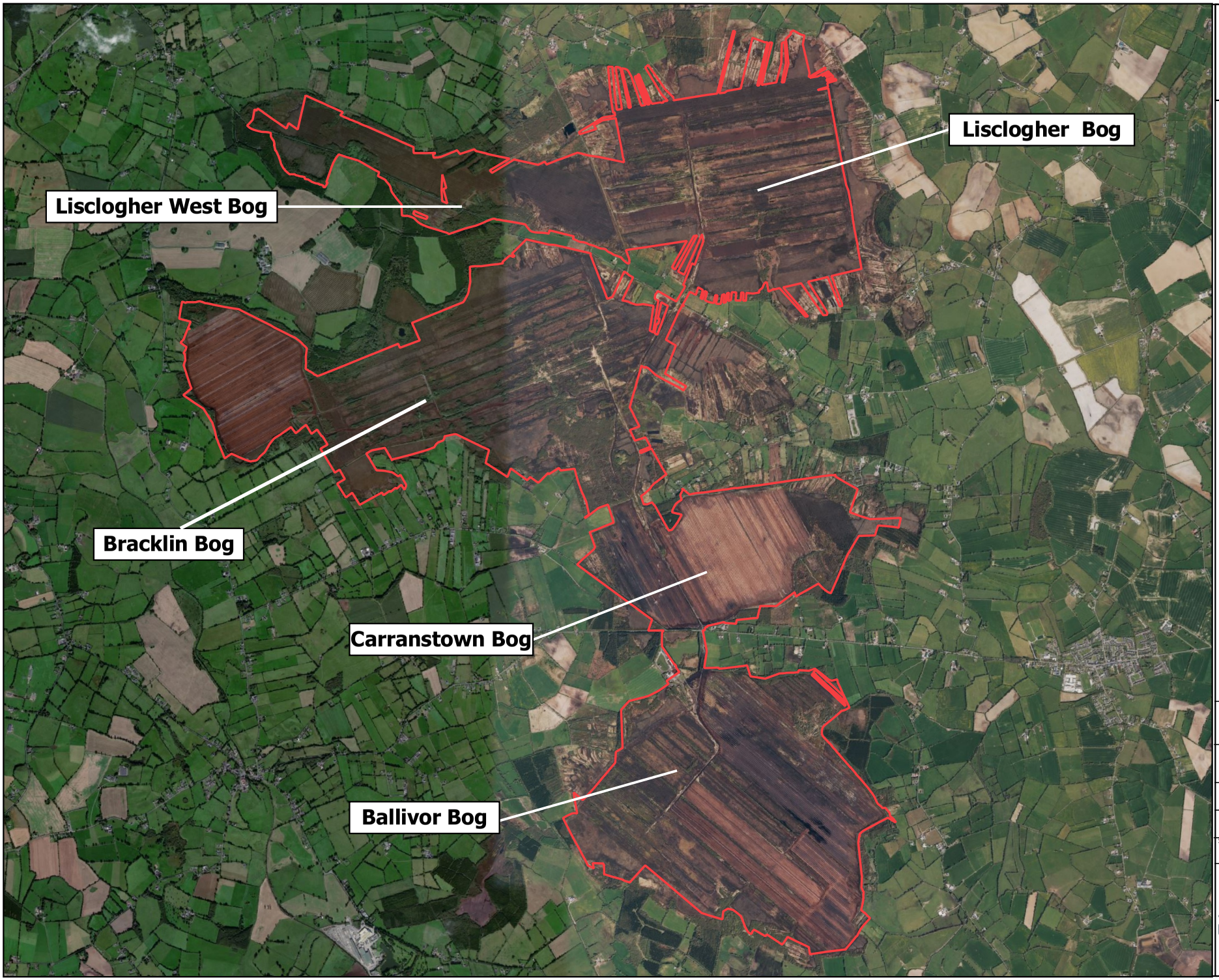
The chapter is structured as follows:

- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the baseline ecological conditions (taking the baseline to be July 1988 as outlined in Chapter 4) and receptor evaluation is then provided.
- This is followed by an assessment of effects which are described with regard to peat extraction activities and all ancillary works from 1988 onwards. Specifically, the likely significant effects on biodiversity as a result of the Project are assessed under three separate phases covering the period from July 1988 onwards when the European Communities Environmental Impact Assessment (EIA) Directive was transposed into Irish Law and as defined in Chapter 1 of this rEIAR:
    - **Peat Extraction Phase** - peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June of 2020 (July 1988 – June 2020). The Peat Extraction Phase is described in detail in Sections 4.4 to Section 4.7 of Chapter 4
    - **Current Phase**- the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in Section 4.8 of Chapter 4.
    - **Remedial Phase** - implementation of the proposed rehabilitation plans for the Ballivor Bog Group, required under Condition 10 of its EPA Licence P0501-01, following the cessation of peat extraction activities in 2020. The Remedial Phase is described in detail in Section 4.9 of Chapter 4
- The potential cumulative effects in combination with other plans and projects are also fully assessed.
- Control and monitoring measures that were implemented during the Peat Extraction Phase and Current Phase are described and discussed in addition to measures proposed under the Remedial Phase. This is followed by an assessment of residual effects taking into consideration the effect of the implemented and proposed mitigation, control and best practice measures.
- The conclusion provides a summary statement on the overall significance of the likely effects on Biodiversity.

The following defines terms utilised in this chapter:

- For the purposes of this rEIAR, the entire Ballivor Bog Group is referred to as 'the Application Site' as shown in Figure 6-1.

- The Project refers to all phases of this remedial EIAR, which are fully detailed in Chapter 4.
- "'Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the Project upon which likely significant effects may have occurred or are anticipated.
- "Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects may have occurred or are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.



Map Legend

Application Site Boundary

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Drawing Title

Ballivor Bog Group Site

Project Title

Ballivor Substitute Consent Application

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137-f	6-1
Scale	Date
1:50,000	02/07/2024

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6.1.1 Statement of Authority

This report has been prepared by Sarah Mullen (B.Sc., M.Sc., Ph.D., ACIEEM) with input from Pádraig Desmond (B.Sc.) and Pat Roberts (B.Sc., MCIEEM). This report has been reviewed by Pat Roberts (B.Sc., M.Sc., MCIEEM).

Pat Roberts is Principal Ecologist at MKO with over 16 years' experience. He currently manages the ecological team within MKO. Pat holds B.Sc. (Hons) in Environmental Science. He has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage.

Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany. Sarah has over 6 years' experience working in ecological consultancy and has extensive experience in undertaking habitat and species surveys and working on Ecological Impact Assessment and Appropriate Assessment.

Pádraig is a Project Ecologist within MKO and holds a B.Sc. (Hons) in Ecology and Environmental Biology. He has four years of ecology survey experience and has worked in consultancy for over three years, working on Ecological Impact Assessment and Appropriate Assessment for a wide range of projects.

The baseline ecological surveys were undertaken by Julie O'Sullivan (B.Sc., M.Sc.), Sarah Mullen (BSc., PhD., ACIEEM), Inga Reich (B.Sc., Ph.D.), Patrick Ellison (B.Sc., M.Sc., ACIEEM), Rachel Walsh (B.Sc.), Aoife Joyce (BSc., MSc.), Cathal Bergin (B.Sc.), Neil Campbell (B.Sc.) and Neansai O' Donovan (B.Sc.), Neill Campbell (B.Sc., M.Sc.), Rudraksh Gupta (B.Sc., M.Sc.), Tom Peters (B.Sc.), Mairead Kavanagh (B.Sc.), Pádraig Desmond (B.Sc.), Cora Twomey (B.Sc.), Ciara Hackett (B.Sc.) and Deepali Mooloo (B.Sc., M.Sc.) of MKO. All surveyors have the relevant skills and experience to undertake the required surveys.

All surveyors have relevant academic qualifications and are competent experts in undertaking the ecological surveys in which they were involved.

6.1.2 Assessment Methodology and Relevant Guidance

The assessment methodology is based primarily upon the Transport Infrastructure Ireland (TII)'s (formerly the National Roads Authority) Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2 (TII, 2009) (referred to hereafter as the TII Ecological Impact Assessment Guidelines), and the survey methodology is based on the TII Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (TII, 2009). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, other guidance including the following guidelines were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM 2018, updated 2022).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA 2022).

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1 of the EIAR.

In addition to the above, the following legislation applies with respect to habitats, fauna and water quality in Ireland and has been considered in the preparation of this report:

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971).
- S.I. No. 327 of 2012 - European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012; S.I. No. 386 of 2015 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015; S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).
- Planning and Development Acts 2000 (as amended).

The following legislation applies with respect to non-native species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

The following planning policies and strategy guidance documents listed below were also considered in the preparation of this assessment:

- Meath County Development Plans 2021-2027, 2013-2019, 2007-2013.
- Westmeath County Development Plan 2021-2027, 2014-2020, 2008-2014, 2002-2008.
- Historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan for 1993 (details of which are provided for in Section 2.3.4 in Chapter 2 of this rEIAR).

6.2 Methodology

The following sections describe the methodologies followed to glean information on the baseline ecological condition of the Application Site and surrounding area in July 1988 as well as the present day.

6.2.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available data pertaining to the Application Site and surrounding area including the following:

- Bord na Móna Habitat Mapping for the Application Site
  - The Application Site was subject to detailed habitat surveys by Bord na Móna ecologists between 2011 and 2012 (with follow-up site visits in subsequent years as outlined below) and detailed habitat maps were prepared.
    - Ballivor Bog: Site surveyed and mapped December 2011, May 2012. Follow up visits between 2011 and 2021 and habitat maps updated where required.
    - Bracklin Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2015-2017 and habitat maps updated where required.
    - Lisclogher Bog: Site surveyed and mapped April 2010. Additional walkover surveys undertaken between 2010 and 2017 and habitat map updated where required.
    - Lisclogher West: Site surveyed and mapped July 2012. Additional site visits undertaken between 2012 and 2016 (visited winter 2016/2017) and habitat maps updated where required.

- Carranstown Bog: Site surveyed and mapped July 2012. Additional walkover surveys undertaken between 2012 and 2021 and habitat maps updated where required.

- Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor Bog Group (included in **Appendix 4-2** of this EIAR)
    - Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.
    - Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.
    - Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan.
    - Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan.
    - Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan.

- Aerial Maps from 1973 to 2020 (included in **Appendix 4-4** of the EIAR).
- Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).
- National Parks and Wildlife Service (NPWS) (2016) Clara Bog SAC (site code 000572) - Conservation Objectives supporting document – raised bog habitats Version 1. June 2016.
- Bord na Móna Breeding and Wintering Bird Survey Reports (2012-2020) undertaken by Biosphere Environmental Services (BES).
- NPWS (2016) Mongan Bog SAC (site code 000580) – Conservation Objectives supporting document – raised bog habitats Version 1. June 2016.
- NPWS (2015) Raheenmore Bog SAC (site code 000582) - Conservation Objectives supporting document – raised bog habitats Version 1. June 2015.
- Aquatic report (2021) and Fisheries report (2021) for Ballivor Wind Farm (ABP Case number ABP-316212-23) prepared by Triturus Environmental Ltd.

The following sources were also consulted in order to obtain information on the ecology of the Application Site and wider area:

- Review of historic 6 inch and 25 inch maps of the Application Site and surrounding area (https://webapps.geohive.ie/mapviewer/index.html).
- Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Application Site is located.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Review of online web-mappers: NPWS, EPA (Envision), Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI).
- Review of NPWS Article 17 maps 2019, 2013 and 2007.
- IFI Reports, where available.
- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes[1].
- Review of relevant available Plans, including the Meath County Development Plan 2021-2027, Meath County Development Plan 2013-2019, Meath County Development Plan 2007-2013, Westmeath County Development Plan 2021-2027, Westmeath County Development Plans 2014-202, 2008-2014 and 2002-2008, the National

[1] *NPWS, 2019, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e, Accessed: 15/04/2021.*

Biodiversity Action Plan 2017-2021, County Westmeath Heritage Plan 2018-2023, and the All Ireland Pollinator Plan 2021-2025.

- Section 2.3.4 in Chapter 2 of this rEIAR also provides a summary of historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan form 1993.
- Review of the Bat Conservation Ireland (BCI) Private Database.

6.2.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this rEIAR, as described in Chapter 2, Section 2.6 of this rEIAR.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. Details of scoping responses pertaining to biodiversity are included in Table 6-1 below.

Table 6-1 Scoping Responses

No.	Consultee	Response
1	An Taisce	None to date
2	Bat Conservation Ireland	None to date
3	Bird Watch Ireland	None to date
4	Butterfly Conservation Ireland (BCI)	None to date
6	Department of Agriculture, Food and the Marine (including forestry)	The Department has no observations at this time.
7	Department of the Environment, Climate and Communications	None to date
8	Department of Housing, Local Government and Heritage	**Nature** • The department requests that NPWS be consulted in regard to any draft peatland rehabilitation plan being prepared for the proposed site • Any draft plan should include specifically that all lands which have potential for re-establishing peat forming habitats (fen/raised bog) be remediated as such. Creation of large scale areas of open habitats should also be prioritised to replace those lost and provide for our red and amber-listed ground nesting birds. Public access should be restricted in such areas • In relation to environmental assessment which may be required both in relation to applications for substitute consent and future proposed development, the Department notes that consideration must be given to potential impacts to European sites. As you will be aware the Planning and Development Act, 2000 (as amended) requires that screening for appropriate assessment and where required, appropriate assessment be undertaken for all development proposals. This is required in order to meet the obligations arising from the provisions of Article 6(3) of the Habitats Directive. These

No.	Consultee	Response
		requirements are addressed in more detail below. • In addition the Department draws your attention to the duties of public authorities in relation to nature conservation as set out in Regulation 27 of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). Public authorities are obliged, when exercising their functions, to take appropriate steps to avoid in European sites the deterioration of natural habitats and the habitats of species, as well as disturbance of species for which a site has been designated insofar as this disturbance could be significant in relation to the objectives of the Habitats Directive. Public authorities, in the exercise of its functions, must also strive to avoid pollution or deterioration of habitats outside Special Protection Areas in accordance with Regulation 27(4) and Article 4(4) of the EU Birds Directive 1979. • The rEIAR should describe baseline environmental conditions as they were on 1st February 1990. The description of the baseline environment needs to be sufficiently accurate to provide a reliable reference against which impacts can be assessed. As the bog units have been in Bord na Móna's ownership since the reference date, significant internal sources of information should be available. Sources of external historical baseline information include data from state agencies such as EPA monitoring data, including river and lake water quality monitoring, bird, mammal, butterfly and plant atlases, aerial photography and reports, including raised bog reports available from the National Parks and Wildlife Service on request. • As noted above the Department advises that screening for appropriate assessment and if required, appropriate assessment must be undertaken in respect of the peat extraction projects which are the subject of planning applications. • The peat harvesting activities associated with the Ballivor Bog Group have occurred upstream of, downstream of, and adjacent to European sites. Screening for appropriate assessment should focus on the likely significant effects of peat extraction and related activities on European sites noting that impacts to sites via air and water may occur over large distances. The Department is of the view that the preparation of a remedial Natura Impact Statement (rNIS) (see Section

No.	Consultee	Response
		177G of the Planning & Development Act 2000 (as amended)) may be required in relation to the planning application. • It is noted that the scope of any rNIS should include the timeframe from the date of enactment of the European Communities (Natural Habitats) Regulations, 1997 (26th February 1997) to the present date. • The rNIS should provide a full description of the development and each bog within the Ballivor Bog Group within the development. • The rEIAR must contain a statement of the significant effects, if any, on the environment, which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out. Potential impacts should be identified using the source-pathway-receptor approach. Impacts should be assessed by analysing the effects of each impact on ecological receptors. The ecological significance of such effects should then be reported in relation to each receptor and appropriate mitigation and/or remediation proposed. The rEIAR must identify and describe adequately the direct and indirect significant effects on the environment of the development. Potential impacts which may be significant and which should be assessed include: o Habitat loss o Species loss o Habitat fragmentation o Hydrological and Hydrogeological impacts o Nature conservation site impacts o Emissions to air o Impacts to climate o Invasive species impacts o Increase in predation of ground nesting birds due to afforestation & habitat degradation o Ecological impacts of dumping o Disturbance to habitats and species both from operations and other activities o Fires
13	Environmental Protection Agency	The Agency is of the opinion that the scope and level of detail to be included in the remedial environmental impact assessment report should as a minimum: (i) address the matters raised in the responses received from the bodies detailed above;

No.	Consultee	Response
		(ii) have regard to the rehabilitation plan(s) required under Condition 10 of Licence Reg No. P0501 for any relevant bog areas; (iii) consideration should be given to inclusion of any relevant bog areas in an enhanced rehabilitation scheme, e.g., under the Peatlands Climate Action Scheme (PCAS). (iv) have regard to relevant water quality monitoring data. Any gaps in water quality data for receiving waters should be filled by a sampling programme over an appropriately representative period of time.
19	Inland Fisheries Ireland	None to date
20	Irish Peatland Conservation Council	None to date
21	Irish Red Grouse Association	None to date
22	Irish Raptor Study Group	None to date
23	Irish Water	None to date
24	Irish Wildlife Trust	None to date
25	Meath County Council - Planning Department	• The scope of works proposed in the Biodiversity Section (5.2.4.6) should include reference to invasive species in accordance with European Communities (Birds and Natural Habitats) Regulations 2011 – Third Schedule (Regulations 49 and 50) • Habitat Surveys should have regard to the extent of Annex I habitats on site – in particular – Annex I habitat Degraded raised bogs still capable of regeneration [code 7120] • It is noted in section 4.2 - 'In compliance with the IPC licence P0501-01, draft Rehabilitation Plans have been produced by Bord na Móna for all Bogs in the Ballivor Bog Group It is a requirement of Condition 10 of the aforementioned IPC Licence, however, that following decommissioning of use or involvement of all or part of the site in the licensed activity, Bord na Móna prepares (to the satisfaction of the EPA) and implements a final Cutaway Bog Rehabilitation Plan for the Ballivor Bog Group. The discharge of Condition 10 will facilitate the permanent rehabilitation of the Ballivor Bog Group in conjunction with any parallel future end-uses (wind energy infrastructure)'.
26	Office of Public Works	None to date
27	Eastern River Basin District	None to date

No.	Consultee	Response
33	Westmeath County Council - Planning Department	None to date

6.2.3 Field Surveys

A comprehensive survey of the biodiversity of Application Site was undertaken on various dates throughout 2020, 2021, 2022, 2023 and 2024 (refer to Table 6-2 below for specific dates). Detailed habitat maps of the Application Site provided by Bord na Móna were used to set the baseline and inform the surveys. Whilst a number of the surveys described below were undertaken to inform the EIAR for the proposed Ballivor Wind Farm, the study area for both the proposed wind farm and the Application Site boundary for this rEIAR overlap. These surveys provide the information necessary to undertake a robust assessment of the likely impacts of the peat extraction activities and all ancillary works, both past and present, and the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation plans, on the Application Site.

Table 6-2 Summary of surveys undertaken to inform the remedial Ecological Impact Assessment and remedial Natura Impact Statement (rNIS)

Survey	Dates
Multi-disciplinary walkover survey	23rd April, 26th May, 4th June and 3rd September 2020 26th and 27th May 2021, 8th and 15th July 2021, 27th September 2021 26th April 2022 16th February and 14th and 22nd of August 2023 24th April 2024 6th June 2024
Detailed habitat and vegetation composition surveys	26th and 27th of May 2021, 27th September 2021 Ground-truthed in 2023 and 2024
Otter surveys	26th and 27th of May 2021, 27th September 2021 Ground-truthed in 2023 and 2024
Aquatic surveys	July 2021 Ground-truthed in 2023 and 2024
Bird surveys	Various dates between October 2019 – March 2023
Marsh Fritillary Surveys	3rd September 2020 27th September 2021 26th September 2022

Survey	Dates
	22nd of August 2023 24th of April 2024 6th of June 2024
Badger Surveys	26th and 27th of May 2021 8th and 15th July 2021 Ground-truthed in 2023 and 2024
Bat Surveys	23rd and 24th of April 2020 4th and 5th of June 2020 3rd and 4th of September 2020 26th of April 2022 19th of August 2022 20th of October 2022

The results of the surveys were used to inform this rEIAR chapter. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

6.2.3.1 Multi-disciplinary Walkover Surveys (as per TII Guidelines, 2009) 2020 - 2024

Multidisciplinary walkover surveys of the Application Site were undertaken throughout 2020, 2021, 2022, 2023, and 2024 in order to ground-truth the habitat-mapping provided by Bord na Móna, based on their ecological surveys of the Application Site in 2011 and 2012.

The Bord na Móna ecology team originally classified the habitats on the Application Site according to the Bord na Móna habitat classification system, provided in Appendix 6-1. Correspondence with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000) is also described in Appendix 6-1. Habitats recorded within the Application Site by MKO during the walkover surveys were classified according to the guidelines set out in *'A Guide to Habitats in Ireland'* Fossitt, 2000), which classifies habitats based on the vegetation present and management history. The survey timings fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011).

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected habitats and species.

The multi-disciplinary walkover surveys comprehensively covered the Application Site with further detailed targeted surveys carried out for features and locations of ecological significance. These surveys were carried out in accordance with TII *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (TII, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

Other targeted survey methodologies undertaken at the Application Site are described in the following subsections.

6.2.3.2 Dedicated Habitat and Vegetation Composition Surveys

Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the Application Site boundary, with relevés undertaken within representative habitats recorded within the Application Site. Relevés were 4x4 metres for all habitats except for woodland which were 10x10 metres. The extent of each habitat on site was mapped using aerial photography, handheld GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on site, including all relevés.

All habitats recorded on site and described in this rEIAR chapter have been classified in accordance with Fossitt (2000).

The habitat surveys have been undertaken with reference to the following guidelines and interpretation documents:

- Cross, J. & Lynn, D. (2013) *Results of a monitoring survey of bog woodland.* Irish Wildlife Manuals, No. 69. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey 2013. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Commission of the European Communities (2007) Interpretation manual of European Union habitats. Eur 27. European Commission DG Environment.
- Foss, P.J. & Crushell, P. 2008, *Guidelines for a National Fen Survey of Ireland, Survey Manual.* Report for the National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.
- NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: *Habitat Assessments*. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
- Smith, G. F., & Crowley, W. (2020) The Habitats of Cutover Raised Bog. Irish Wildlife Manuals 128. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive 92/43/EEC were identified and classified as Key Ecological Receptors (KERs).

Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010), while mosses and liverworts nomenclature follows '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

6.2.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies, incidental records of protected species recorded during multidisciplinary walkover surveys were used to inform the scope of targeted ecological surveys required.

Based on the above, dedicated surveys for marsh fritillary, bats, otter, badger, birds and aquatic fauna were undertaken at the times set out below with the methodologies followed also provided below. Following the completion of ecological walkover surveys, no requirement for further dedicated faunal surveys was identified. During the multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, beetles etc. were recorded.

6.2.3.3.1 Badger Survey

Areas within the Application Site boundary identified as providing potential habitat for badger were subject to specialist targeted survey. The badger surveys were not constrained by vegetation given the nature of the habitats within the Application Site.

The badger surveys were conducted in order to determine the presence or absence of badger signs within the Application Site. This involved a search for all potential badger signs as per TII (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in TII (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (TII, 2009) and followed the *'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes'* (TII, 2006 and CIEEM best practice competencies for species surveys (CIEEM, 2013).

Camera traps

Camera traps were deployed at the location of a badger sett identified within the Application Site during dedicated badger surveys undertaken on the 26th and 27th May 2021 to determine whether the sett was in use. The camera traps were deployed for seven days. The locations of these are shown in Figure 6-2 in Appendix 6-4 (Confidential Information).

6.2.3.3.2 Otter Survey

Dedicated otter surveys were conducted on the watercourses within the Application Site which were identified as providing suitable habitat for otter. Additional otter surveys were undertaken by Ross Macklin of Triturus Environmental Ltd. during aquatic surveying of the watercourses within the vicinity of the Application Site in July 2021.

The otter survey was conducted as per TII (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter survey also followed the guidance as set out in TII (2008) *'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes'* and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

6.2.3.3.3 Marsh Fritillary Surveys

Following the identification of suitable habitat for marsh fritillary within the Application Site during walkover surveys undertaken in 2020, as well as the results of the desk study, targeted larval web surveys for the species were undertaken between 2021 and 2024. The surveys were undertaken within the optimal period for undertaking marsh fritillary larval web surveys, i.e. August – September, in addition to during other stages of its life cycle. All surveys were undertaken on dry days, with no rain and no to little wind.

The survey methodology followed that described in the TII (2009) best practice guidance document. This involved walked surveys to identify suitable areas of marsh fritillary habitat within the Application Site. This was achieved by walking transects through areas of potentially suitable habitat. Where suitable habitat did occur, detailed surveys to locate larval webs were undertaken. In addition, habitat

suitability assessments were undertaken within areas of suitable habitat for the species following those developed by the NBDC. This involved an assessment of the vegetation characteristics at a requisite number of stops within the area of suitable habitat. Records of vegetation height, abundance of devil's bit scabious, presence of structured vegetation, low invading scrub and stock grazing were noted within the relevant recording sheets.

6.2.3.3.4 Bat Surveys

A detailed description of bat survey methodologies undertaken at the Application Site during 2022 is provided in the Bat Report Summary in Appendix 6-2 along with dates and details of all surveyors.

Surveys carried out in 2022 were in accordance with NatureScot, 2021, and form the core dataset for the assessment of effects on bats. 2022 results are supplemented by data collected during surveys undertaken on the Application Site in 2020 and designed in accordance with SNH, 2019 Guidelines. The surveys included bat walkover surveys to assess the suitability of the Application Site to support roosting, foraging and commuting bats and roost surveys, manual walked transects and ground-level static surveys in 2022.

Suitability of the Application Site to support bats was assessed according to Collins (2016) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High, Moderate, Low* and *Negligible*.

6.2.3.3.5 Aquatic surveys

Aquatic surveys of the watercourses draining the Application Site were conducted by Ross Macklin of Triturus Environmental Ltd. A total of 20 sites were surveyed. The site locations are shown in Figure 2-1 of the Aquatic Report in Appendix 6-3. While the surveys were undertaken to inform the EIAR for the proposed Ballivor Wind Farm, the survey covered all watercourses draining the Application Site and the survey effort was considered sufficient to provide comprehensive information on the nature of the watercourses within and draining the Application Site.

The surveys included Biological Water Quality (Q sampling) which was assessed through kick sampling, electrofishing and a broad aquatic habitat assessment at each location which assessed watercourses in terms of:

- Physical watercourse/waterbody characteristics (i.e., width, depth etc.).
- Substrate type, listing substrate fractions in order of dominance (i.e., bedrock, boulder, cobble, gravel, sand, silt etc.).
- River profile in the sampling area.
- An appraisal of the macrophyte and aquatic bryophyte community at each site.
- Riparian vegetation composition.

The methodologies for the aquatic surveys are described within the aquatic report.

6.2.3.3.6 Bird Surveys

Bird surveys were undertaken by MKO at the Application Site between 2020 and 2023. While the surveys were undertaken to inform the EIAR for the proposed Ballivor Wind Farm, the study area for the bird surveys covered the entire Application Site. These surveys provide the information necessary to undertake a robust assessment of the likely impacts of the peat extraction activities and all ancillary works, both past and present, and the implementation of the proposed rehabilitation plans, on the Application Site. These field surveys were undertaken in compliance with SNH guidance (SNH 2017). The relevant survey methodologies and effort are described in full detail in Appendix 6-5 and relevant information summarised below.

6.2.3.3.7 Breeding Walkover Surveys (O'Brien & Smith Survey)

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify areas of possible, probable, or confirmed breeding territories for bird species observed within the study area, i.e. Application Site and a 500m radius of the Application Site. The survey methodology followed the O'Brien & Smith method for lowland sites as outlined in Gilbert et al. (1998).

Transect routes were devised to ensure the required coverage of different habitat was achieved within the Application Site. Transects were selected to ensure all areas of suitable breeding/ foraging habitat were approached to within 100m of the Application Site boundary. Target species included waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Walkover surveys were carried out between daylight hours during the core breeding season months of April, May, June and July, within the Application Site being visited four to six days per month on each occasion. The timing of visits followed the recommendations of Calladine et al. (2009). Following all survey visits, the field maps were analysed to determine the number and location of breeding territories. All non-breeding individuals and species encountered were also recorded.

6.2.3.3.8 Breeding Raptor Surveys

Breeding raptor surveys (i.e. birds of prey and owls) were undertaken within the Application Site and its immediate surroundings. Survey methodology was as outlined in Hardey et al. (2013). These surveys aimed to identify occupied territories and monitor their breeding success within the Application Site. Raptor surveys were undertaken to a 2km radius from the Application Site, in the form of short VP watches and walked transects within this Application Site. These surveys were undertaken monthly during the core breeding season period. Each round of surveys was undertaken over four days to survey the entirety of the Application Site.

6.2.3.3.9 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert et.al (1998). Surveys were undertaken in May and June, in areas of suitable habitat within the Application Site and 500m beyond the Application Site boundary. Surveys commenced one hour before sunset and continued for one hour after sunset or until it was too dark to see. Transects were slowly walked through areas of suitable woodland habitat onsite. All observations of woodcock (as well as the areas covered) were recorded. The aim of the survey was to record the presence of roding (displaying) male woodcock and thereby establish the distribution and abundance of the species in the Application Site. This survey method also allowed the observer to survey for owls, i.e. barn owls and long-eared owls.

6.2.3.3.10 Winter Walkover Surveys

Winter transect surveys were undertaken to record the presence of bird species of high conservation concern within areas of potentially suitable habitat in the Application Site. The study area extended 500m outside the Application Site.

The methodology was broadly based on methods described in Bibby et al. (2000) and adapted Brown and Shepherd surveys' (SNH, 2017). Target species were raptors, waterbirds, gulls and ground birds of conservation interest. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

6.2.3.3.11 Invasive Species Survey

During the multi-disciplinary walkover surveys and botanical surveys, a search for non-native invasive species was also undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

6.2.3.3.12 Survey Limitations

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the field surveys that were undertaken to establish the current ecology of the Application Site. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the Application Site were readily identifiable during the site visits and comprehensive assessments were made during the field visit and no limitations have been identified in this regard.

The description of the 1988 baseline below is based on a desk study involving a review of available literature and mapping, including existing habitat mapping of the Application Site provided by Bord na Móna. Aerial photography and information provided by Bord na Móna on the timelines of drainage, vegetation stripping, peat extraction and other associated activities at the Application Site were also studied in detail. In addition, information gathered during field surveys of the Application Site undertaken by MKO between 2020 and 2024 was also used. These surveys provided information on the nature of the habitats present in areas where peat extraction had very recently ceased, in areas where peat cutting had ceased for some time and in areas of remnant raised bog which had never been subject to peat extraction. Using this information it is possible to infer what the ecological baseline at the Application Site was likely to have been in 1988. However, no detailed, site specific ecology and habitat surveys from that time are available to inform the description.

While many of the surveys described in this Chapter were undertaken to inform the EIAR for the proposed Ballivor Wind Farm, the study area for the wind farm and the Application Site overlap. The surveys undertaken comprehensively covered the Application Site and provide the information required to undertake a robust assessment of the likely significant effect of peat extraction activities and all ancillary works on biodiversity.

6.2.4 Methodology for Assessment of Impacts and Effects

6.2.4.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following the aforementioned comprehensive desk study, the initial site visits and stakeholder consultation (refer to Section 6.2.2 above for details of consultations undertaken); "Target receptors" likely to occur in the zone of influence (as defined in Section 6.1 above) of the Project were identified. The target receptors included habitats and species that were protected under the following legislation:

- Annexes of the EU Habitats Directive and EU Birds Directive.
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the likely zone of impact.
- Species protected under the Wildlife Acts 1976-2021.

- Species protected under the Flora Protection Order 2015.

6.2.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the Application Site and its vicinity was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (TII, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- International;
- National;
- County;
- Local Importance (Higher Value); and
- Local Importance (Lower Value).

The TII guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and are of importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines (TII, 2009) and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in the guidelines (TII, 2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

6.2.4.3 Characterisation of Impacts and Effects

Developments or projects can result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM *'Guidelines for Ecological Impact Assessment in the UK and Ireland'* (2018, updated 2022). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA guidance (EPA 2022). The headings under which the impacts are characterised follow those listed in the CIEEM guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether a proposed development or Project results in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem

short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.

- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

6.2.4.4 Determining the Significance of Effects

The ecological significance of the effects of a proposed development or Project are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018, updated 2022).

For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018, updated 2022).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features.
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA Guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) and the Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines. The terminology used in the determination of significance follows the suggested language set out in the EPA Guidelines (2022) as shown in Table 6-3.

Table 6-3 Criteria for determining significance of effect, based on (EPA, 2022) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.

Effect Magnitude	Definition
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (2009) and CIEEM (2018, updated 2022) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

- The likely effects on 'integrity' should be used as a measure to determine whether an impact on a site is likely to be significant (TII, 2009).
- A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018 updated 2022).

Integrity

In the context of EcIA, 'integrity' refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (TII, 2009). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018, updated 2022) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing.
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the TII/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is

related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

6.2.4.5 Incorporation of Control Measures and Mitigation

Section 6.5 of this rEIAR assesses the likely significant effects of peat extraction activities and all ancillary works since July 1988 on sensitive ecological receptors and outlines the best practice and control measures, where applicable, that were/are in place during the Peat Extraction Phase and Current Phases. It also outlines mitigation measures which are to be in place during the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation plans for the Application Site during the Remedial Phase. Since the year 2000 all operations at the Application Site have been licenced under IPC Licence (No. P0501) and have been subject to the conditions of that licence. It is currently proposed to implement a Cutaway Bog Decommissioning and Rehabilitation plan to fulfil the requirements of Condition 10 of the IPC licence. The objective of this plan is to stabilise and rehabilitate the peatland habitats within the Application Site. The implemented control measures and mitigation measures avoid or reduce or offset potential significant residual effects, post mitigation.

6.3 Establishing the Ecological Baseline

6.3.1 Desk Study

The following sections provide the results of a detailed desk study undertaken to collate information on the ecology of the Application Site and the surrounding area (refer to Section 6.2). As outlined in Chapter 1 of this rEIAR, the Project covers the period from July 1988, the timeframe for when the European Communities Environmental Impact Assessment (EIA) Directive was transposed into Irish Law, until present day. Therefore, the ecological baseline against which the assessment in this chapter is undertaken is taken to be July 1988. The sections below provide information gleaned from a desk study which help establish the ecological baseline conditions that are likely to have existed at the Application Site and surrounding area in 1988.

The Application Site is located within the 10km grid squares (hectads) N55, N65, and N66. In addition to presenting information on the 1988 ecological baseline of the Application Site, information gathered during the desk study on the ecology of the wider area, (particularly the hectads N55, N65 and N66) is also presented. This includes records for protected species records (both historical and current), information on Annex I protected habitats in the area and information on water quality. While historical information is presented where available, e.g. previous Bird Atlases, NPWS records, information on water quality, much of the information presented on the surrounding area relates to recent records obtained from the National Biodiversity Data Centre (NBDC) and other sources.

6.3.1.1 Site Location

The Application Site comprises five bogs known collectively as the Ballivor Bog Group located at the Westmeath-Meath County border. The bogs include Ballivor Bog at the southern extent of the Application Site, Carranstown and Bracklin Bogs towards the centre of the Application Site and Lisclogher and Lisclogher West Bogs to the north and comprises an overall Application Site area of 2,421 hectares (ha). The Application Site is located approximately 3.7km east of the village of Raharney, 4.5km south of Delvin town, Co. Westmeath and 2.5km west of Ballivor village, Co. Meath. The south of the Application Site is bissected by the R156 which joins the villages of Ballivor in the east to Raharney in the west. The information below pertaining to the individual bogs within the Application Site was gleaned from aerial imagery and information provided by Bord na Móna as well as the Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans for the individual bogs comprising the Application Site.

6.3.1.2 1988 Ecological Baseline

As outlined in Chapter 4 of this rEIAR, by 1988, the land use at the Application Site was well established as industrial peat extraction. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in place. The main entrance points to the Application Site were located north and south off the Ballivor-Raharney (R156) road. Other access points included the machine pass/rail crossings between Bracklin and Lisclogher bog. The Ballivor Works, which comprised a peat processing plant, canteen, storage sheds, and maintenance buildings, was located in the north of Ballivor Bog, where it is still located in present day.

Ballivor Bog

Satellite imagery and annual reports indicate that by 3rd July 1988, Ballivor Bog was undergoing both sod and milled peat extraction. The associated drainage and rail infrastructure required for this activity was in situ. Aerial imagery, provided in Appendix 4-4, and records show the bog comprised a large area of cutover bog, dominated by large areas of bare peat. Small sections of remnant uncut raised bog were evident predominantly along the western and south-western boundaries. A small area of bog woodland was evident along the south-western boundary and areas of scrub/woodland were evident around the margins of the bog.

Drainage for both types of extraction was already inserted, predominantly in a northwest-southeast orientation and two pumps were in operation. Railway infrastructure was laid in the bog (since the 1950s), terminating at the Works building located in the north of the bog, just off the Ballivor-Raharney (R156) road. The Works area housed several peat processing buildings, canteen and welfare facilities, waste storage areas, carparking facilities and a refuelling area. The bog included 7 no. artificial silt ponds, and 7 no. surface water emission points which remain *in situ* today. The Clondalee More stream flows out from the southwest of the bog. The main access point to Ballivor Bog was off the Ballivor-Raharney (R156) road adjacent to the Works area. The topography of Ballivor Bog is estimated to have been approximately 74m – 82mOD by July 1988.

Carranstown Bog

Aerial imagery from 1988 (Appendix 4-4) indicates that extraction for milled peat was underway on in the western portion of Carranstown Bog. The eastern section was drained at the edges but vegetation removal and extraction had not commenced.

A review of aerial imagery shows that the western section of the bog comprised a large area of cutover bog dominated by bare peat. Smaller areas of bare peat were present in aerial imagery in the eastern section, but much of the bog although drained remained vegetated. Therefore, much of the eastern section would predominantly have comprised an area of remnant uncut but degraded (due to drainage) raised bog.

Two small mineral islands are present in Carranstown supporting oak-ash-hazel woodland with birch, hazel and small numbers of oak. These are evident from historical mapping and from aerial imagery of Carranstown from 1988. Areas of bog woodland and scrub are also evident around the periphery of Carranstown.

Carranstown Bog was linked to Ballivor Bog to the south and Bracklin Bog to the north via railway infrastructure. The bog included 5 no. artificial silt ponds, and 4 no. surface water emission points which remain *insitu* today. The Killaconnigan stream runs along the southern boundary of the bog. The main access point to the bog was off the Ballivor-Raharney (R156) road, directly opposite the entrance to Ballivor Bog and this still remains the main access point today. The topography of the bog is estimated to have been approximately 72 – 78mOD by July 1988.

Bracklin Bog

By 1988, peat extraction was underway in the main Bracklin Bog area and the southern portion of Bracklin West which at this point, was undergoing milled extraction. The northern section of Bracklin West was drained, however, vegetation had not yet been removed.

Aerial imagery provided by BnM (Appendix 4-4) shows that Bracklin comprised a large area of cutover bog comprising significant areas of bare peat in the central and southern-west sections, with evidence of linear vegetation visible in the central section, most likely comprised of birch-dominated scrub and/or linear strips of woodland as a present today. Pioneer vegetation communities of cutover bog, such as pioneer poor fen, heath and scrub, were likely beginning to establish on areas where peat production had ceased.

The northern section of Bracklin West, having been drained but not stripped of vegetation would have comprised an area of degraded (due to extensive drainage within and surrounding this section) and fragmented remnant raised bog. Several small areas of remnant uncut raised bog (totalling approx. 255 hectares), also remained intact, predominantly at the edges of the bog in the southern section of Bracklin but also at the north-eastern boundary.

The area around the old famine house would have comprised of areas of woodland as are evident today, comprising birch, sycamore and hazel, as well as areas of grassland.

The very southern section of Bracklin Bog, which was not in production comprised areas of uncut raised bog and was also vegetated at this time (refer to aerial photographs) with scrub and areas of grassland.

Drainage was already inserted, and railway infrastructure laid in 1950s and 1960s, connecting it to Carranstown and Lisclogher. The bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *in situ* today. The main access point to the bog is via a machine pass off a local road at the northeast close to Lisclogher or from the south through Carranstown bog. The topography of the bog is estimated to have been approximately 75m –- 89mOD by July 1988.

Lisclogher

By 1988, the centre of the bog had been drained and sod peat extraction was underway. The bog comprised a large area of cutover bog dominated by bare peat. The extremities of the bogs were not under extraction and comprised smaller areas of fragmented uncut, but degraded due to drainage, remnant raised bog.

An area of birch dominated woodland was present at the south of the bog bordered by two small areas of remnant raised bog. A stream flows from north to south through the woodland.

Railway infrastructure was *in-situ*, connecting the bog to Bracklin to the west, across a local road. Access to the site was and remains via the local road to the west which separates it from Lisclogher-West or via the machine pass from Bracklin to the south. The topography of the bog is estimated to have been approximately 73 –- 79mOD by July 1988.

Lisclogher-West

Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approximately 22ha, as deduced from available aerial imagery. This area was never subject to peat extraction. An area of 106ha of Lisclogher West Bog was never subject to drainage or peat extraction works. Therefore, this area, in 1988, comprised mainly of uncut and undrained raised bog and associated marginal habitats, including bog woodland (evident along parts of the southern boundary from aerial imagery) and likely areas of fen. The uncut, undrained area of raised bog would have once formed part of a more extensive raised bog system across the Ballivor Bog Group

(Application Site) and therefore would have been fragmented and isolated due to the large-scale drainage and peat extraction in the remaining areas of the Application Site.

The topography of the bog is estimated to have been approximately 77 – 82mOD by July 1988. As the bog was not brought into peat extraction it is assumed that the existing topography is representative of the topography in 1988. The Cartenstown stream flows in a west-to-east direction through the bog and the Bolandstown stream flows west-to-east along the southern boundary of the bog. Access to the bog was and remains via a local road which runs through the bog in an east-to-west direction or via a local road which separates Lisclogher-West from Lisclogher.

6.3.1.2.1 Description of Habitats at the Application Site - 1988

Raised Bog Habitat

Prior to any drainage, the entire Application Site would have likely been covered by predominantly uncut raised bog, and associated habitats including bog woodland, fen and flush.

Raised bogs are accumulations of deep acid peat (3-12m in depth) that originate in shallow lake basins or topographical depressions. They have a typical elevated domed surface which grows upwards from the surface. The dome is primarily rainwater fed and isolated from the groundwater table giving rise to acid conditions which support distinctive specialised vegetation communities tolerant of such acid conditions.

Raised bogs vegetation communities are grouped into a series of community complexes which in turn are amalgamated into a series of ecotopes characterised by different physical characteristics.

The main ecotopes that community complexes are grouped into include:

- Central ecotope
- Sub-central ecotope
- Active flushes and soaks
- Sub-marginal ecotope
- Marginal ecotope
- Inactive flushes
- Face-bank ecotope

Actively accumulating peat conditions occur within the sub-central and central ecotope, which are the wettest on the bog and an indication of good quality active raised bog. Active raised bog is characterised by an actively growing upper layer known as the acrotelm (peat-forming layer of the bog) which is composed mainly of Sphagnum mosses. The surface of intact active raised bog is typically wet, acid and deficient in plant nutrients with a complex microtopography of hummocks and hollows on the bog surface. Sphagnum mosses dominate the ground layer. Bogs are generally driest at the edges becoming wetter towards the centre where well-developed pool systems are common. Dy areas and hummocks typically support ling heather (*Calluna vulgaris*), deergrass (*Trichophorum germanicum*), hare's tail cottongrass (*Eriophorum vaginatum*), cross-leaved heath (*Erica tetralix*) and Sphagnum and other moss species. Wetter areas and pools are generally characterised by common cottongrass (*Eriophorum angustifolium*), bog asphodel (*Narthecium ossifragum*), white beak sedge (*Rhynchospora alba*), bogbean (*Menyanthes trifoliata*) and Sphagnum mosses (Fossit, 2000). Active raised bog is a priority habitat listed under Annex I of the Habitats Directive and is described as a raised bog which is "*still capable of peat formation, or if peat formation has temporarily ceased*". Active flushes and soaks are also dominated by Sphagnum mosses and typically have wet conditions. These features are associated with active raised bog and contribute to the overall diversity of the habitat. The adjacent surrounding marginal, sub-marginal, and face-bank bog areas typically have a supporting function for the central and sub-central communities but are not peat accumulating.

In 1988, predominantly smaller areas of uncut raised bog would have been present, mostly at the margins of the Application Site where peat extraction would not have occurred. These areas of raised bog were small, fragmented and would have been degraded in nature due to the extensive drainage that had been inserted in the majority of the wider bog by this stage. Whilst drainage had been inserted in Carrantown east and the northern section of Bracklin West, vegetation at these locations was still intact and therefore these areas would also have comprised larger areas of degraded raised bog. Sphagnum moss cover was likely much reduced and ling heather more abundant in these areas compared to an undrained intact raised bog, due to the lowered water table. It is unlikely, given the extensive drainage that had been inserted within and surrounding these sections of raised bog that any significant areas of active raised bog would have remained.

Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approximately 22ha, as deduced from available aerial imagery. This area was never subject to peat extraction. An area of 106ha of Lisclogher West Bog was never subject to drainage or peat extraction works. While this would have once formed part of the overall Ballivor Bog Group intact raised bog prior to drainage and peat extraction, in 1988 the areas of Lisclogher bog that remained undrained and uncut in 1998 formed an isolated section of remnant raised bog. However, it is possible that Lisclogher West would have contained some areas of degraded raised bog capable of natural regeneration and some micro-topographical features typical of an uncut raised bog such as hummocks, hollows and pools.

Cutover Bog

Taking the information provided in Section 6.3.1.2 above on the individual bogs within the Ballivor Bog Group, the vast majority of the Application Site in 1988 would have been classified as cutover bog. Cutover bog is a variable habitat, or complex of habitats, that can include mosaics of bare peat and revegetated areas with woodland, scrub, heath, fen and flush or grassland communities. The nature of the recolonising vegetation depends on numerous factors including the frequency and extent of disturbance, hydrology, the depth of peat remaining, and the nature of the peat and the underlying substratum (Smith and Crowley, 2020).

In 1988, the cutover bog habitat at the Application Site would have comprised predominantly of bare peat where large sections of the bogs had been drained and vegetation removed. Where peat extraction had ceased for some time, these areas would have begun to be colonised by vegetation communities typical of cutover bog habitats and similar to those present on parts of the Application Site today, i.e. a mosaic of birch dominated scrub and woodland with some willow, generally dry in nature, ling heather dominated secondary heath vegetation, pioneer poor fen dominated by common bog cotton and areas of dry and wet grassland.

Oak-ash-hazel woodland

Small areas of oak-ash-hazel woodland are present in Carranstown Bog on small mineral islands. A review of aerial imagery shows these areas of oak-ash-hazel woodland were present pre-1988. Today these areas comprise birch, hazel and some oak and are likely to have been similar in species composition in 1988.

6.3.1.2.2 *Fauna at the Application Site - 1988*

The faunal species on the Application Site in 1988 would have comprised species typical of cutover bog and raised bog habitats.

Typical Fauna of Raised Bog

Raised bogs are nutrient poor ecosystems and the acidic, waterlogged and exposed conditions mean they support a low faunal species diversity (NPWS 2016 SSCOs for Clara Bog, Mongan Bog and Raheenmore Bog which are considered good examples of raised bog habitat in Ireland).

The lack of suitable foraging and breeding places on raised bog habitats make raised bog largely unsuitable for many mammal species. Irish hare is the most commonly occurring mammal species on raised bogs. Other species recorded from marginal areas and watercourses surrounding bogs include otter (*Lutra lutra*), pygmy shrew (*Sorex minutus*), badger (*Meles meles*), pine marten (*Martes martes*) and fox (*Vulpes vulpes*) (NPWS 2016).

Common frog is the most common reptile whilst common lizard may also be found.

18 no. species of birds have been reported breeding on raised bogs (Wilson 1990), however, many of these use the bog as nesting habitat only and are dependent of other habitats including open water bodies, callows and wet grassland for feeding. A few species, meadow pipit (*Anthus pratensis*), skylark (*Alauda arvensis*) and curlew (*Numenius arquata*) complete their full breeding cycle on raised bog and the first two species are the most commonly occurring species (Bracken *et* al. 2008). Red grouse is also considered a typical bog species occurring year-round as a resident. Other species that have been recorded breeding on raised bog include mallard, Greenland white-fronted goose, hen harrier, cuckoo, merlin, kestrel, snipe, golden plover and lapwing.

In terms of invertebrates, while information on invertebrate assemblages typical of raised bog is limited, two species of Lepidoptera have been identified as characteristic of raised bog habitat, i.e bordered grey (*Selidosema brunnearia*) and light knot grass (*Acronicta menyanthidis*). Marsh fritillary butterfly and large heath butterfly are also typically associated with peatland habitats.

Species mentioned above are not confined to active raised bog habitat and most, if not all, will use other areas of the bog and surrounding habitats, including cutover bog.

Typical Fauna of Cutover bog

By 1988 the majority of the Application Site was cutover bog with smaller areas of uncut raised bog remaining at Lisclogher West as well as mostly around the margins of the other bogs within the Application Site. The Application Site, therefore, while it may have supported populations of some species typical of raised bog habitats in the remnant raised bog areas, is more likely to have supported faunal assemblages typical of cutover bog habitats and similar to the faunal assemblages present today which include skylark, meadow pipit, Irish hare, badger, otter.

6.3.1.3 Current Habitats Present at Ballivor Bog Group

Bord na Móna Ecology Surveys and Habitat Mapping

As detailed in Section 6.2.1, the Application Site was subject to detailed habitat surveys by Bord na Móna ecologists between 2010 and 2012 and detailed habitat maps were prepared. The Application Site was initially surveyed and mapped December 2011, May 2012. Follow up visits were undertaken between 2001 and 2021 and habitat maps updated where required.

A review of the habitat maps prepared by Bord na Móna for Ballivor Bog Group shows that the Application Site comprises a mosaic of cutover bog habitats including areas of bare peat, scrub, bog woodland, secondary heath type vegetation, pioneer open cutaway habitats, fen and grassland. Areas of remnant uncut raised bog are also present. The largest areas occur at Lisclogher West and the margins of Lisclogher and Bracklin Bogs. Smaller areas of remnant raised bog are also present at the margins of Ballivor and Carranstown Bogs. Small areas of conifer plantation are also present at Lisclogher West

and Carranstown. Areas of remnant bog have been damaged by fire including an area of remnant raised bog in Bracklin Bog as well as the area of remnant raised bog at the northern extent of Lisclogher.

Westmeath Wetland Survey 2020

Westmeath County Council commissioned a field survey of 12 wetland sites within Co. Westmeath in 2020 to gather baseline information on the type, extent and conditions of selected sites. One of the sites was Lisclogher/Bracklin Bog, located to the north of the Bracklin Bog boundary within the Application Site. The report describes the majority of the Application Site as degraded raised bog with a small lake in the center and a fringe of woodland. According to the report, a variety of vegetation encircles Bracklin Lough, in the center of the Application Site, the surrounds of which are mainly wooded. The outer, higher area of bog woodland is dominated by a canopy of Scot's pine with a well-developed ground layer of heather and bilberry. This transitions into a wetter type of bog woodland which was found to correspond to Annex I Bog Woodland (91D0) towards the lake. An area of transition mire was also recorded along the northern and western edges of the lake.

6.3.1.4 Designated Sites within the Likely Zone of Influence of Peat Extraction Activities from 1988 onwards

The potential for peat extraction activities and all ancillary works from 1988 onwards to impact on sites that are designated for nature conservation was considered in this section.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The likely significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the remedial Appropriate Assessment Screening Report and remedial Natura Impact Statement that accompanies the application for substitute consent. As per EPA Guidance 2022, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 6.4.2 of this rEIAR provides a summary of the key assessment findings with regard to European Designated Sites.

Natural Heritage Areas (NHAs) are designated under Section 18 of the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The likely significant effects of peat extraction activities and all ancillary works on these designated sites is fully considered in this assessment.

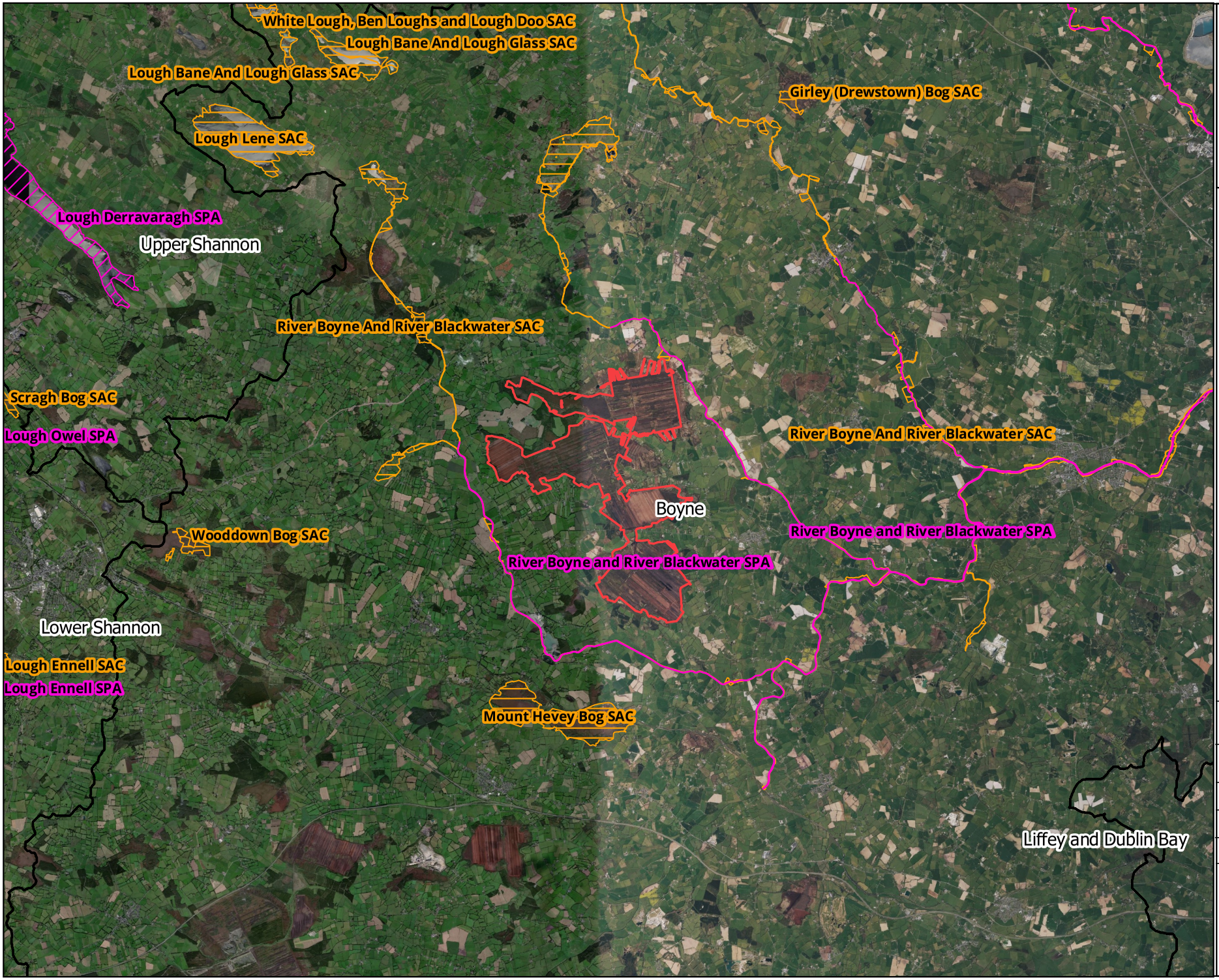
Proposed Natural Heritage Areas (pNHAs) were listed on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these sites is fully considered in this assessment.

The following methodology was used to establish which of the sites designated for nature conservation have the potential to be impacted by the peat extraction activities and all ancillary works:

- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 04/07/2024. The datasets were utilised to identify Designated Sites which could feasibly be affected by the peat extraction activities and all ancillary works.
- All European and Nationally Designated Sites that could potentially be affected were identified using a source-pathway-receptor model. To provide context for the assessment, Designated Sites surrounding the Application Site are shown on Figure 6-3 and Figure 6-4. Sites that were further away from the Application Site were also considered and, in this case, no potential source-pathway-receptor chain for effect on any additional Designated Site was identified.

- Information on these sites with regard to their conservation objectives is provided in Table 6-4.
- The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 04/07/2024.
- All European Designated Sites and the QIs/SCIs for which they're designated, are fully described and assessed in the Screening for Appropriate Assessment and remedial Natura Impact Statement reports submitted as part of the Substitute Consent application.

Where potential pathways for Likely Significant Effects were identified, the site is included within the Likely Zone of Impact and further assessment is required.



Map Legend

- Application Site Boundary
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- WFD Hydrological Catchments

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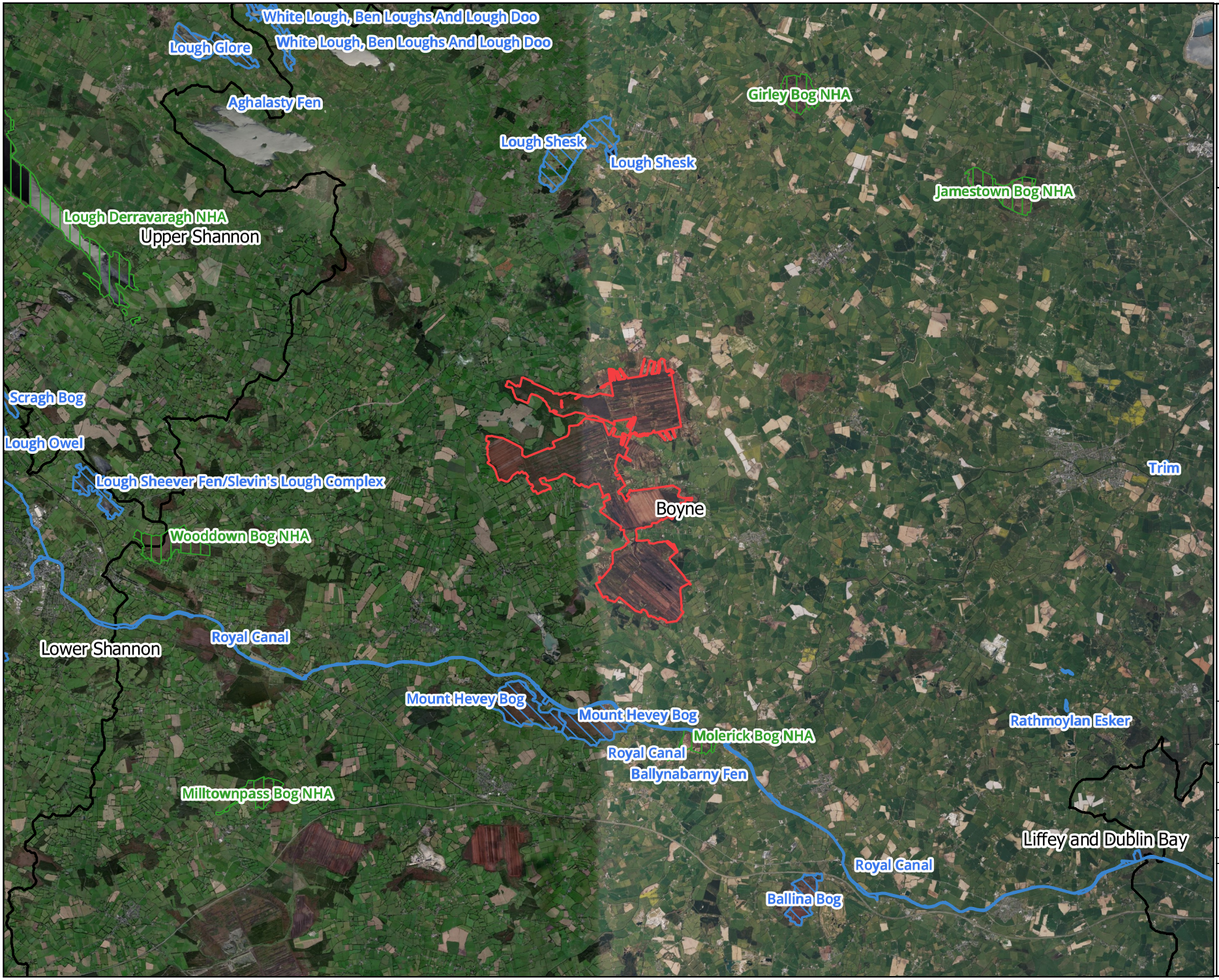
N

Drawing Title
EU Desingnated Sites surrounding the application site

Project Title
Ballivor Substitute Consent Application

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137-f	6-3
Scale	Date
1:175,000	02/07/2024

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Map Legend

- Application Site Boundary
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)
- WFD Hydrological Catchments

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N

Drawing Title
National Desingnated Sites surrounding the application site

Project Title
Ballivor Substitute Consent Application

Drawn By	Checked By
PD	SM
Project No.	Drawing No.
191137-f	6-4
Scale	Date
1:175,000	02/07/2024

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Table 6-4 Identification of European and Nationally designated sites within the Likely Zone of Impact

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
Special Area of Conservation		
River Boyne and River Blackwater SAC [002299]	Located adjacent to the north-eastern boundary of the Application Site.	Following a precautionary principle, a potential pathway for direct effects on otter where they occur outside the SAC, as a result of direct habitat loss was identified. Direct habitat loss could potentially occur during drain maintenance works if any otter resting or breeding sites are present on the Application Site. There is hydrological connectivity between the Application Site and this SAC via drainage ditches and watercourses within the Application Site which discharge to the Stonyford River approx. 248m to the east of the Application Site and the Deel (Raharney) River, approximately 767m to the west of the Application Site, both of which are designated as part of the SAC at this location and discharge to the River Boyne downstream of the Application Site. The Ballivor stream which drains Ballivor Bog at the south of the Application Site has connectivity with the River Boyne approximately 5.9km downstream of the Application Site. A potential pathway for indirect effects on the aquatic QIs of this SAC as a result of peat extraction activities and all ancillary works during both the Peat Extraction Phase and Current Phase was identified. During these phases there would have been and currently is potential for deterioration in surface and ground water quality due to run off of pollutants, including silts and hydrocarbons, to watercourses within and downstream of the Application Site. Therefore, a potential pathway for indirect effects on the aquatic QIs of the SAC where they occur downstream of the Application Site was identified. For the Remedial Phase, during the implementation of the proposed rehabilitation plans for Ballivor Bog Group there will be a requirement for small volumes of machinery and personnel on site for drain blocking works. Taking a precautionary approach, a potential pathway for indirect effects on the above listed QIs during the implementation of the proposed rehabilitation plans as a result of deterioration of water quality due to runoff of pollutants during such works was identified.

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
		A potential pathway for indirect effects on otter as a result of disturbance was also identified. Applying the precautionary principle, a potential pathway for indirect effects on the SAC via dust deposition was identified. **This SAC is therefore within the likely zone of impact and following the precautionary principle the potential for significant effect on the above QIs exists. Further assessment is required.**
Mount Hevey Bog SAC [002342]	3.3 km South-West	No hydrological or habitat connectivity was identified between the Application Site and these SACs. There is no surface water or habitat connectivity between the Application Site and these SACs. Surface water from the Application Site drains to the Deel (Raharney) River to the west and south of the site and to the Stonyford River to the east of the site, both of which discharge to the River Boyne which in turn flows east before discharging to the Irish Sea >70km downstream of the Application Site. These SACs are not designated for ground-water dependent habitats or species and therefore no potential for indirect effects via groundwater pathways was identified. Given the absence of habitat and hydrological connectivity and the distance between the Application Site and these SACs, there is no potential for indirect effects on these European Sites. **These SACs are therefore not within the likely zone of influence of the Project.**
Girley (Drewstown) Bog SAC [002203]	9.9 km North-East	
Wooddown Bog SAC [002205]	10.3 km West	
Lough Lene SAC [002121]	10.6 km North-West	
Lough Bane and Lough Glass SAC [002120]	11.7 km North-West	
White Lough, Ben Loughs and Lough Doo SAC [001810]	13.4 km North-West	
Boyne Coast and Estuary SAC [001957]	48km North-East & >70km downstream	No pathway for direct effects was identified as this European Site lies entirely outside of and approximately 48km from the Application Site. The potential for the Project to result in indirect effects on this European Site was considered. The site is located >70km downstream of the Project and designated for coastal habitats Given the significant distance between the Application Site and the SAC, and the attenuation properties of the intervening watercourses, no potential for significant indirect effects on the EU site was identified.

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
		There is no potential for significant effect on this European Site and it is not located within the Zone of Likely Impact and no further assessment is required
Special Protection Areas (SPA)		
River Boyne and River Blackwater SPA [00232]	230m East of the Application Site boundary	Taking a precautionary approach, a potential pathway for direct effects on Kingfisher, where they occur outside the SPA, as a result of direct habitat loss was identified. If Kingfisher nesting habitat is present within the Application Site, there is potential for loss of this habitat during drain maintenance works. There is hydrological connectivity between the Application Site and this SPA via watercourses within the Application Site which discharge to the Stonyford River to the east, the Deel (Raharney) River to the west and the River Boyne, all of which are designated as part of the SPA. A potential pathway for indirect effects on kingfisher as a result of peat extraction activities and all ancillary works during both the Peat Extraction Phase and Current Phase was identified. During these phases there would have been and currently is potential for deterioration in surface water quality due to run-off of pollutants, including silts and hydrocarbons, to watercourses within and downstream of the site. This has potential to result in habitat degradation for kingfisher and negatively affect availability of food resources for the SCI species kingfisher. For the Remedial Phase, during the implementation of the proposed rehabilitation plans for Ballivor Bog Group there will likely be a requirement for small volumes of machinery and personnel on site for drain blocking works. Taking a precautionary approach a potential pathway for indirect effects on kingfisher as a result of deterioration of water quality due to runoff of pollutants during such works was identified. Taking a precautionary approach a potential pathway for indirect effects on kingfisher during all phases of the Project, as a result of disturbance was also identified. **This SPA is therefore within the likely zone of impact and following the precautionary principle the potential for significant effect on**

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
		the Kingfisher was identified. Further assessment is required.
Lough Derravaragh SPA [004030]	13.4km North-West	There is no hydrological connectivity between the Application Site and the SPA which is located in a different hydrological sub-catchment to the Application Site. Therefore, no potential for indirect effect on supporting wetland habitat for SCI bird species due to deterioration in water quality exists. The Application Site lies outside the core foraging distance of the SCI species Whooper swan (core range of <5km) as per Scottish Natural Heritage Guidelines (SNH, 2016). Given the distance between the Application Site and the SPA, no potential for significant indirect disturbance or displacement effects on whooper swan or any other SCI species as a result of peat extraction activities and all ancillary works was identified. **This SPA is therefore not within the Likely Zone of Impact.**
Boyne Estuary SPA [004080]	48km North-East & >70km downstream	No pathway for direct effects was identified as this European Site lies entirely outside of and approximately 47.3km from the Application Site boundary. The potential for the Project to result in indirect effects on this European Site was considered. There is hydrological connectivity between the Application Site and this SPA via watercourses within and adjacent to the Application Site boundary which discharge to the Stonyford River to the east and the Deel (Raharney) River to the south-west. These in turn discharge to the River Boyne which in turn discharges to the SPA. The site is located >70km downstream of the Application Site. Given the significant distance between the Project and the SPA, and the attenuation properties of the intervening watercourses, no potential for significant indirect effects on this European Site due to deterioration of water quality was identified. The Application Site either lies outside the core foraging range (SNH 2016) or does not provide significant suitable habitat for the SCI species associated with the SPA. Therefore, no potential for significant effects on the SPA as a result of disturbance or displacement of SCI species are anticipated.

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
		There is no potential for significant effect on this European Site. It is not located within the Zone of Likely Impact and no further assessment is required
Natural Heritage Areas (NHA)		
Molerick Bog NHA [001582]	3.9km south	There will be no direct effects on these sites given that the Project is located entirely outside and >3km from any of these designated sites. No habitat or surface water connectivity was identified between the Application Site and these designated sites. Surface water from the Application Site drains to the Deel (Raharney) River to the west and south of the site and to the Stonyford River to the east of the Application Site, both of which discharge to the River Boyne which in turn flows east before discharging to the Irish Sea >70km downstream of the Application Site. Given the absence of connectivity and the distance between the Application Site and these NHAs, no potential for indirect effects on these sites due to deterioration of water quality or habitat loss/degradation has been identified. **No pathway for effect was identified and these sites are not within the likely zone of influence.**
Girley Bog NHA [001580]	9.9km north-east	
Wooddown Bog NHA [000694]	10.3km west	
Jamestown Bog NHA [001324]	12.4km north-east	
Lough Derravaragh NHA [000684]	13km north-west	
Milltownpass Bog NHA [002323]	13.1km south-west	
Proposed Natural Heritage Area (pNHA)		
Royal Canal pNHA [002103]	3.2km south	Direct effects on these pNHAs can be ruled out as the Application Site lies entirely outside the designated sites. No hydrological connectivity has been identified between the Application Site and these pNHAs. In addition, given the significant separation in distance between the Application Site and these pNHAs, as well as the nature and scale of the peat extraction activities and all ancillary works, no potential for any indirect effects on these sites has been identified. **No pathway for effect was identified and these sites are not within the Likely Zone of Impact.**
Lough Shesk pNHA [000556]	6.6km north	
Ballina Bog pNHA [000390]	10.1km south-east	
Aghalasty Fen pNHA [001349]	12.8km north-west	
Lough Sheever Fen/Slevin's Lough Complex pNHA [000690]	13km west	
Trim pNHA [001357]	16km east	

Designated Site	Distance from Application Site (km)	Likely Zone of Impact Determination
Boyne Woods pNHA [001592]	26km north-east	These sites are located >20km downstream of the Application Site via the River Boyne which itself is located hydrologically downstream of the Application Site. Taking a precautionary approach a potential pathway for indirect effects on these sites via deterioration in water quality was identified. **These sites are within the Likely Zone of Impact and are assessed further in Section 6.5 below.**
Crewbane Marsh pNHA [000553]	35km north-east	
Rossnaree Riverbank pNHA [001589]	35km north-east	
Dowth Wetland pNHA [001861]	40km north-east	
Boyne River Islands pNHA [001862]	42km north-east	
Boyne Coast and Estuary SAC and pNHA [001957]	48km north-east	This coastal pNHA is located >70km downstream of the Application Site. Given the nature of the development and the distance downstream no potential for significant impact was identified.

6.3.1.5 Water Quality

Section 8.3 in Chapter 8 of this rEIAR: Hydrology and Hydrogeology, provides a detailed description of the hydrological and hydrogeological baseline environment, along with the current environment. A summary of this baseline is provided for below.

6.3.1.5.1 *Water Framework Directive Surface Water Body Status - 1988 Baseline*

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722/2003).

Given the timelines for the establishment and its transposition into Irish law, there is no WFD Information for Surface Water Bodies for 1988.

As such the 2010-2015 WFD Status Reports have been used to infer the 1988 baseline, and the subsequent WFD reporting periods are included to provide context.

The impacts of the activities on the WFD status of downstream and underlying waterbodies are assessed in Appendix 8-4 of this rEIAR. A summary of the Water Framework Directive (WFD) status and risk result of Surface Water Bodies (SWBs) in the vicinity and downstream of the Application Site are shown in Table 6-5 below.

The western section of Bracklin Bog is drained by the Deel (Raharney)_030 SWB. The status of this SWB has improved from "Moderate" in the 2013-2018 round to "Good" in the latest round (2016-2021). Further downstream the Deel (Raharney)_040 SWB achieved "Good" status in all 3 no. monitoring rounds while the Deel (Raharney)_050 SWB was assigned "Moderate" status. The Deel (Raharney)_060 SWB drains the western section of Ballivor Bog and its status has increased from "Moderate" in the 2010-2015 round to "Good" in the 2013-2018 round and has remained of "Good" status in the latest 2016-2021 round. Further downstream the Boyne_050 achieved "Good" status in all 3 no. WFD rounds.

The Boyne_060 SWB drains the eastern section of Ballivor Bog and Carranstown Bog. This SWB has also experienced an improved status from "Moderate" in 2010-2015 to "Good" in 2013-2018 and 2016-2021. The Stonyford River drains Lisclogher, Lisclogher West and Bracklin bogs. The Stonyford_030 has consistently deteriorated in status throughout each of the WFD rounds, having "Good" status in 2010-2015, to "Moderate" in 2013-2018, to "Poor" in 2016-2021. The Stonyford_040 however, received a deterioration in status from "Good" in 2010-2015 to "Moderate" in 2013-2018 and remained to be of "Moderate" status in 2016-2021. Further downstream the Boyne_070 and Boyne_080 both achieved "Moderate" status in the latest WFD round.

The majority of these SWBs have been deemed to be "At risk" of not meeting their WFD objectives. Hydromorphological changes have been deemed to be significant stressors on several of these SWBs. Hydromorphological pressures mean that the waterbody has experienced change to its physical habitat or natural functioning caused by, for example, channelisation and straightening of rivers or land drainage. Drainage of the Application Site to facilitate peat extraction activities and all ancillary works will likely have impacted the local hydrological regime by altering the natural flow volumes and has potentially contributed to increased sediment concentrations (which is not borne out by water quality monitoring data as demonstrated above) in waterbodies due to the increase in connectivity of drains within the Application Site to the surrounding river network.

Table 6-5 Summary WFD Information for Surface Water Bodies

River Waterbody	Status 2010-2015	Status 2013-2018	Status 2016-2021	3rd Cycle Risk Status
Deel (Raharney)_030	Good	Moderate	Good	At Risk
Deel (Raharney)_040	Good	Good	Good	Not at Risk
Deel (Raharney)_050	Moderate	Moderate	Moderate	At Risk
Deel (Raharney)_060	Moderate	Good	Good	Under Review
Boyne_050	Good	Good	Good	Not at Risk
Boyne_060	Moderate	Good	Good	At Risk
Stonyford_030	Good	Moderate	Poor	At Risk
Stonyford_040	Good	Moderate	Moderate	At Risk
Boyne_070	Good	Moderate	Moderate	At Risk
Boyne_080	Moderate	Moderate	Moderate	At Risk

6.3.1.5.2 Water Framework Directive Groundwater Body Status -1988 Baseline

Local Groundwater Body (GWB) and Surface water Body (SWB) status reports are available for download from (www.wfdireland.ie).

The Athboy GWB (IE_EA_G_001) underlies the Application Site. This GWB has been assigned 'Good Status' in both the 2010-2015, 2013-2018, and 2016-2021monitoring rounds. This status is defined based

on the quantitative status and chemical status of the GWB. The Athboy GWB is deemed to be "At risk" of not meeting its WFD objectives, however, no significant pressures have been identified to be impacting this GWB.

6.3.1.5.3 EPA Biological Q-Rating Monitoring

1988 Baseline EPA Q-Ratings

The information in this section has been taken from Chapter 8 (Hydrology & Hydrogeology) of this rEIAR. As outlined in Chapter 8, no Biological Q-rating data is available for 1988 due to the fact that no EPA monitoring was completed during this calendar year. However, EPA Q-rating monitoring was completed on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the Application Site in 1985 and 1986 and this data is used to infer the 1988 baseline

This historic data, listed in Table 6-6, shows that the Deel (Raharney), Stonyford and Boyne rivers downstream of the site were of 'Good' or 'High' Q-value status at 1988. Meanwhile upstream of the Application Site, the Deel (Raharney) River achieved 'Moderate' status upstream of Cummer Bridge (Station Code: RS07D010100). However, all 5 no. monitoring stations downstream of the Application Site on the Deel (Raharney) River achieved 'High' Q-value status (Station Code: RS07D010200 – RS07D010600). To the east and downstream of the Application Site, the Stonyford River was of 'Good' status (Station Code: RS07S020100 - RS07S020400). The Boyne River achieved 'Good' Q-value status downstream of its confluence with the Deel (Raharney) river (Station Code: RS07B040800) and 'High' Q-rating status downstream of its confluence with the Stonyford River (Station Code: RS07B041000).

Table 6-6 Baseline (1988) Q-ratings

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Deel (Raharney)*	RS07D010100	Bridge upstream Cummer Bridge (upstream of site)	3.5 (1985)	Moderate
Deel (Raharney)	RS07D010200	Cummer Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010300	Raharney Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010400	Inan Bridge	5 (1985)	High
Deel (Raharney)	RS07D010500	Clondalee Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4-5 (1985)	High
Boyne	RS07B040800	Inchamore Bridge	4-5 (1986)	High
Boyne	RS07B040900	Scariff Bridge	5 (1986)	High
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	4 (1985)	Good
Stonyford	RS07S020200	Earl's Bridge	4 (1985)	Good
Stonyford	RS07S020300	Shanco Bridge	4 (1985)	Good

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Stonyford	RS07S020400	Stonyford Bridge	4 (1985)	Good
Boyne	RS07B041000	Derrinydaly Bridge	5 (1986)	High

EPA Q-Ratings during Peat Extraction Phase (1988-2020)

EPA Q-rating monitoring has been completed at several dates and at multiple locations on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the Application Site between 1988 and 2020 as outlined in Chapter 8 of this rEIAR and summarised below. Historic Q-values for the Deel (Raharney) River are shown in Table 6-7. Of the monitoring locations situated downstream of the Application Site, 'High' status was not achieved after 1990. The Deel (Raharney) River achieved 'High' status downstream of the Application Site and upstream of its confluence with the River Boyne in 1990 (Station Code: RS07D010600). The lowest Q-value assigned to the Deel (Raharney) River downstream of the Application Site occurred at Raharney Bridge in 2003 when it achieved 'Poor' status (Station Code: RS07D010300). Generally however the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during the Peat Extraction Phase.

Table 6-7 Summary of Q-Ratings on the Deel (Raharney) River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07D010070	Bridge west of Mabestown (upstream of site)	255870	265493	1990 - 2020	3.5 – 4.5
RS07D010090	Bridge upstream of Lough Analla (upstream of site)	256495	262448	1990 – 2003	3 - 4
RS07D010100	Bridge upstream of Cummer Bridge (upstream of site)	257915.83	260230.25	1985 - 1990	3.5 – 4.5
RS07D010200	Cummer Bridge	258458	257621	1985 – 2020	3.5 – 4
RS07D010300	Raharney Bridge	260085	253021	1985 - 2020	3.5 – 4
RS07D010400	Inan Brodge	263452	250407	1985 - 2020	3.5 – 4
RS07D010600	Bridge upstream of confluence with Boyne River	269031	249313	1985 - 2020	3.5 - 4

Historic Q-values for the Stonyford River are shown in Table 6-8. The Stonyford River recieves discharge from Lisclogher, Lisclogher West, Bracklin and Carranstown bogs. Of the monitoring locations situated downstream of the Application Site, 'High' status was not achieved at any date during the Peat Extraction Phase. The lowest Q-value assigned to the Stonyford River downstream of the Application Site at Stonyford Bridge (Station Code: RS07S020075) and at a bridge near Rathkenna (Station Code: RS07S020100) which both achieved 'Poor' status in 2020. Generally however the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during the Peat Extraction Phase.

Table 6-8 Summary of Q-Ratings on the Stonyford River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07S020065	Bridge near Ballinlough (upstream of site)	262027	264264	2000 - 2020	3.5 – 4
RS07S020070	Bridge near Clonmaskill (upstream of site)	262103	262562	1990 - 1997	3.5

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07S020075	Stonestown Bridge (upstream of site)	263805	261681	2000 - 2020	3 – 4
RS07S020100	Upstream of Rathkenna Bridge	268303	257165	1981 - 1985	4
RS07S020090	Upstream of Rathkenna Bridge	267684	258139	1990 - 2003	3.5 – 4
RS07S020080	Lisclogher Bridge	265568	261131	1990 - 1997	3.5 – 4
RS07S020400	Stonyford Bridge	273148	253252	1990 - 2020	3.5 – 4.5
RS07S020300	Shanco Bridge	270561	254707	1990 - 2003	4
RS07S020200	Earl's Bridge	269403	256080	1990	4

Historic Q-values for the River Boyne are shown in Table 6-9. The Boyne River recieves discharge from Carranstown and Ballivor Bogs and from the remainder of the Application Site via the Deel (Raharney) and Stonyford Rivers. Of the monitoring locations situated downstream of the site, 'High' status was achieved on 2 no. occasions at Inchamore Bridge (Station Code: RS07B040800). The lowest Q-rating status assigned to the Boyne River during the Peat Extraction Phase was 'Moderate' status. Generally the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during this phase of the Project.

Table 6-9 Summary of Q-Ratings on the Boyne River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Desciption	Easting	Northing	Available Data	EPA Q-Rating Range
RS07B040600	Ashfield Bridge	268466	244868	1990 - 2020	3 – 3.5
RS07B040800	Inchamore Bridge	271093	249913	1990 - 2020	3.5 – 4.5
RS07B040900	Scariff Bridge	273392	252679	1990 - 2020	3.5 - 5
RS07B041000	Derrinydaly Bridge	276679	253937	1990 - 2020	3.5 – 5
RS07B041100	Downstream of Athboy confluence	278039	256559	1990 - 2020	3.5 - 4

EPA Q-Ratings During Current Phase (2020 – Present Day)

No available EPA Biological Q-rating monitoring data post-dates 2020. The most recent Q-rating data for the Deel (Raharney), Stonyford and Boyne rivers is presented in Table 6-10 below. This data shows

that the Q-status of the Deel (Raharney), Stonyford and Boyne rivers downstream of the Application Site ranges from 'Poor' to 'Good' status.

Table 6-10 Most recent (2020) Q-ratings

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Deel (Raharney)	RS07D010200	Cummer Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010300	Raharney Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010400	Inan Bridge	3-4 (2020)	Moderate
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4 (2020)	Good
Boyne	RS07B040800	Inchamore Bridge	4 (2020)	Good
Boyne	RS07B040900	Scariff Bridge	4 (2020)	Good
Stonyford*	RS07S020075	Stonestown Bridge	3 (2020)	Poor
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	3 (2020)	Poor
Stonyford	RS07S020400	Stonyford Bridge	3-4 (2020)	Moderate
Boyne	RS07B041000	Derrinydaly Bridge	3-4 (2020)	Moderate

6.3.1.6 Bird Records

6.3.1.6.1 Bird Atlases - 1988 Baseline

Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland' (Balmer et al., 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland.

Previous Bird Atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

- Sharrock, J.T.R. (1976) The atlas of breeding birds in Britain and Ireland.
- Lack, P.C. (1986) The atlas of wintering birds in Britain and Ireland.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) The new atlas of breeding birds in Britain and Ireland: 1988-1991.

The Application Site lies within hectads N55, N65 and N66. Table 6-11 presents a list of bird species of conservation interest recorded from the relevant hectads for the periods 1968-1972, 1988-1991 (1988 Baseline) and 2007 – 2011. The data for time periods before and after the 1988 Baseline are presented to provide context for breeding birds species over time:

Table 6-11 Breeding Bird Atlas Data (Hectads N55, N65 & N66)

Species Name	Breeding Atlas 68-72			Breeding Atlas 88-91 (1988 Baseline)			Breeding Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	N55	N65	N66	
Barn Owl (*Tyto alba*)	-	-	Prob	-	-	-	-	-	-	RL

Species Name	Breeding Atlas 68-72			Breeding Atlas 88-91 (1988 Baseline)			Breeding Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	N55	N65	N66	
Corncrake (*Crex crex*)	Prob	Prob	Conf	-	-	-	-	-	-	BD
Curlew (*Numenius arquata*)	Conf	Conf	-	Seen	Seen	Seen	-	-	-	RL
Grey Partridge (*Perdix perdix*)	Conf	-	-	-	-	-	-	-	-	RL
Grey Wagtail (*Motacilla cinereal*)	Conf	-	Conf	-	-	-	Poss	-	Poss	RL
Kestrel (*Falco tinnunculus*)	Conf	Poss	Prob	Seen	Seen	Seen	Prob	Poss	Poss	RL
Kingfisher (*Alcedo atthis*)	Conf	Conf	Prob	-	Seen	Seen	Poss	-	-	BD
Lapwing (*Vanellus vanellus*)	Conf	Poss	-	Bred	-	-	-	-	-	RL
Meadow Pipit (Anthus pratensis)	Conf	Conf	Conf	Seen	Bred	Bred	Conf	Conf	Prob	RL
Peregrine (*Falco peregrinus*)	-	-	-	-	-	-	Poss	-	Poss	BD
Red Grouse (*Lagopus lagopus*)	-	-	Conf	-	-	-	-	-	-	RL
Snipe (*Gallinago gallinago*)	Conf	Prob	Conf	Bred	Seen	Seen	-	Prob	Prob	RL
Stock Dove (*Columba oenas*)	Conf	-	Conf	-	Seen	Seen	-	Poss	-	RL
Swift (*Apus apus*)	Conf	Conf	Conf	Bred	-	Bred	Conf	Poss	Prob	RL
Whinchat (*Saxicola rubetra*)	Conf	-	-	-	-	Seen	Prob	-	-	RL
Woodcock (*Scolopax rusticola*)	Prob	Prob	-	-	-	-	-	-	-	RL
Yellowhammer (*Emberiza cintrinella*)	Conf	Conf	Conf	Seen	Bred	Seen	Prob	Prob	Poss	RL

Seen = recorded; Poss = possible breeding; Prob = probable breeding; Conf = confirmed breeding; - = not-recorded; Non-B = Non-Breeding Record; Bred = Breeding Record. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed, AL = BoCCI Amber Listed

Table 6-12 shows those species recorded in the relevant hectads (N55, N65 and N66) in the wintering birds' atlases that are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list for the periods 1981-1984 (1988 Baseline) and 2007 – 2011. The time periods after the 1988 Baseline are presented to provide context of the wintering birds species over time:

Table 6-12 Wintering Bird Atlas Data (Hectads N55, N65 & N66)

Species Name	Wintering Atlas 81-84			Wintering Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	
Barn Owl (*Tyto alba*)	-	-	Pres	-	-	-	RL
Bewick's Swan (*Cygnus columbianus*)	-	-	Pres	-	-	-	BD
Curlew (*Numenius arquata*)	-	-	-	Pres	Pres	Pres	RL
Golden Plover (*Pluvialis apricaria*)	Pres	Pres	-	-	-	-	BD

Species Name	Wintering Atlas 81-84			Wintering Atlas 07-11			Conservation Status
	N55	N65	N66	N55	N65	N66	
Grey Wagtail (*Motacilla cinereal*)	Pres	-	-	-	Pres	Pres	RL
Kestrel (*Falco tinnunculus*)	Pres	-	-	Pres	Pres	Pres	RL
Lapwing (*Vanellus vanellus*)	Pres	Pres	Pres	Pres	Pres	Pres	RL
Meadow Pipit (Anthus pratensis)	Pres	Pres	Pres	-	Pres	Pres	RL
Merlin (Falco columarius)	-	Pres	-	-	-	-	BD
Redwing (*Turdus iliacus*)	Pres	Pres	Pres	Pres	Pres	Pres	RL
Snipe (*Gallinago gallinago*)	Pres	Pres	-	Pres	Pres	Pres	RL
Stock Dove (*Columba oenas*)	Pres	Pres	Pres	Pres	Pres	-	RL
Whooper Swan (*Cygnus cygnus*)	-	-	-	Pres	-	Pres	BD
Woodcock (*Scolopax rusticola*)	Pres	-	-	-	Pres	-	RL
Yellowhammer (*Emberiza cintrinella*)	Pres	-	Pres	-	Pres	-	RL

Pres = present in hectad; - = not recorded. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed

6.3.1.6.2 Bird Surveys of Ballivor Bog Group (Bord na Móna) – from 2013 to 2020 (Peat Extraction Phase)

Breeding Bird Surveys

Biosphere Environmental Services (BES) undertook breeding bird surveys (April to September inclusive) of the Application Site on behalf of Bord na Móna in 2013, 2014, 2016 and 2019. The following bird species of conservation concern i.e. listed either on Annex I of the EU Birds Directive or on the Birds of Conservation Concern Ireland (BoCCI) were recorded within the Application Site during the surveys. Species marked with an asterisk were not recorded breeding within the Application Site, whereas those without an asterisk were classified as breeding (possible, probable or confirmed according to the breeding status codes of the Bird Atlas 2007-2011).

Table 6-13 Annex I and BoCCI red-listed bird species recorded on the Application Site during breeding bird surveys undertaken in 2019

Common Name	Scientific name	Year (Yes/No)				Designation
		2013	2014	2016	2019	
*Hen harrier	*Circus cyaneus*	Y	N	N	Y	Annex I
*Kestrel	*Falco tinnunculus*	Y	Y	Y	Y	BoCCI Redlist
Merlin	*Falco columbarius*	N	Y	Y	Y	Annex I
*Peregrine	*Falco peregrinus*	Y	Y	Y	Y	Annex I
Snipe	*Gallinago gallinago*	Y	Y	Y	Y	BoCCI Redlist
Woodcock	*Scolopax rusticola*	Y	Y	Y	Y	BoCCI Redlist
Meadow pipit	*Anthus pratensis*	Y	Y	Y	Y	BoCCI Redlist
*Swift	*Apus apus*	Y	Y	N	N	BoCCI Redlist
*Curlew	*Numenius arquata*	N	N	Y	N	BoCCI Redlist
*Whinchat	*Saxicola rubetra*	N	N	Y	N	BoCCI Redlist

** Non-breeding within the Application Site*

Wintering Bird Surveys

Wintering bird surveys (October to March inclusive) were undertaken by BES on Ballivor Bog group in 2012/13, 2013/14, , 2015/2016, 2016/2017 and 2019/2020. Species recorded utilising the Application Site during wintering bird surveys are listed in Table 6-14 below.

Table 6-14 Bird species listed on Annex I of the EU Birds Directive or the BoCCI redlist recorded at the Application Site during wintering bird surveys 2019-2020

Common Name	Scientific Name	Year					Designation
		2012-2013	2013-2014	2015-2016	2016-2017	2019-2020	
Whooper Swan	*Cygnus cygnus*	Y	N		N	N	Annex I
Hen harrier	*Circus cyaneus*	Y	Y		Y	Y	Annex I
Kestrel	*Falco tinnunculus*	Y	Y		Y	Y	BoCCI Redlist
Red Grouse	*Lagopus lagopus hibernicus*	Y	N		N	N	BoCCI Redlist
Merlin	*Falco columbarius*	N	N		N	Y	Annex I
Peregrine	*Falco peregrinus*	N	Y		Y	Y	Annex I
Snipe	*Gallinago gallinago*	Y	Y		Y	Y	BoCCI Redlist
Golden plover	*Pluvialis apricaria*	Y	Y		Y	Y	Annex I, BoCCI Redlist
Lapwing	*Vanellus vanellus*	N	Y		Y	Y	BoCCI Redlist
Woodcock	*Scolopax rusticola*	Y	Y		Y	Y	BoCCI Redlist
Meadow pipit	*Anthus pratensis*	N	N		Y	Y	BoCCI Redlist
Curlew	*Numenius arquata*	N	Y		N	N	BoCCI Redlist

Annex I of EU Birds Directive, BoCCI = Birds of Conservation Concern Ireland

6.3.1.7 Other Protected Species & Habitats Records – 1988 Baseline

The following sections present the results of a search for records (historical and current) of protected species from the area surrounding the Application Site, with a focus on hectads N55, N65 and N66 within which the Application Site is located. The desk study aims to provide a baseline of the Application Site for 1988, but records before and after 1988 are also included to provide a temporal understanding of the Application Site.

6.3.1.7.1 *Vascular plants*

A search was made in the New Atlas of the British and Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book - 1 Vascular Plants (Curtis, 1988 and Wyse Jackson *et al.* 2016) or the Flora (Protection) Order (1999, as amended 2022) had been recorded in the relevant 10km squares in which the

Application Site is situated (N55, N65 and N66). Each hectad contains 100 whole one-kilometre squares containing terrestrial habitats. Species of conservation concern are listed in Table 6-15.

Table 6-15 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectads N55, N65 and N66 – Pre 1970 - 1999

Common name	Scientific name	Designation	Date	Hectad
Marsh saxifrage	*Saxifraga hirculus*	Annex II, FPO, Near Threatened (NT)	Pre 1970	N65, N66
Shepherd's-needle	*Scandix pecten-veneris*	Regionally Extinct (RE)	Pre 1970	N55
Good-King-Henry	*Chenopodium bonus-henricus*	Vulnerable (VU)	Pre 1970	N55
Irish whitebeam	*Sorbus hibernica*	Vulnerable (VU)	1970-1986	N66
Upright brome	*Bromopsis erecta*	Near Threatened (NT)	1970-1986	N55
Smooth brome	*Bromus racemosus*	Near Threatened (NT)	1987-1999	N55
Dwarf spurge	*Euphorbia exigua*	Near Threatened (NT)	Pre 1970	N55
Autumn gentian	*Gentianella amarella*	Near Threatened (NT)	Pre 1970	N55
Common gromwell	*Lithospermum officinale*	Near Threatened (NT)	Pre 1970	N55
Tubular water-dropwort	*Oenanthe fistulosa*	Near Threatened (NT)	Pre 1970	N55
Black horehound	*Ballota nigra*	Near Threatened (NT)	Pre 1970 1970-1986	N55, N65
Greater knapweed	*Centaurea scabiosa*	Near Threatened (NT)	1987-1999 Pre 1970	N55, N65
Round-leaved wintergreen	*Pyrola rotundifolia subsp. rotundifolia*	Near Threatened (NT)	Pre 1970 1970-1986	N65, N66
Brown beak-sedge	*Rhynchospora fusca*	Near Threatened (NT)	Pre 1970	N65
Marsh fern	*Thelypteris palustris*	Near Threatened (NT)	Pre 1970	N65
Vervain	*Verbena officinalis*	Near Threatened (NT)	Pre 1970	N65
Bur chervil	*Anthriscus caucalis*	Near Threatened (NT)	1970-1986	N66
Frog orchid	*Coeloglossum viride*	Near Threatened (NT)	Pre 1970, 1970-1986	N55, N66
Least bur-reed	*Sparganium natans*	Near Threatened (NT)	1970-1986	N66

6.3.1.7.2 Bryophytes

A search of the NPWS online data map for bryophytes (NPWS, 2022) was also undertaken to establish whether there are records for protected bryophytes within and in the vicinity of the Application Site. The online map shows no records for protected bryophytes within or adjacent to the Application Site.

6.3.1.7.3 NPWS Protected Species Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna (excluding birds) have been recorded from hectads N55, N65 and N66. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 10th August 2020. A response was received on the 19th August 2020. Updated requests were sent on the 23rd August 2022 and the 21st of May 2024 with responses received on the 1st September 2022 and 23rd of May 2024, respectively. Table 6-16 lists rare and protected species records obtained from NPWS. Records are presented as pre-1988, 1988 baseline, and post 1988. The time periods before and after the 1988 Baseline are presented to provide context of the protected species over time.

Table 6-16 NPWS records for rare and protected species

Common name	Scientific name	Designation	Period	Hectad
N/a	*Cladonia ciliata var. tenuis*	Annex V	1988 baseline	N65
Reindeer Moss	*Cladonia portentosa*	Annex V	1988 baseline, post 1988	N55, N65
Hairy St John's-wort	*Hypericum hirsutum*	Annex II, FPO, RL	Post 1988	N55
Round-leaved Wintergreen	*Pyrola rotundifolia subsp. Rotundifolia*	RL	Pre 1988, Post 1988	N66
Marsh Saxifrage	*Saxifraga hirculus*	Annex II, IV, FPO, RL	Pre 1988	N66
Bur chervil	*Anthriscus caucalis*	RL	Pre 1988	N66
White-clawed Crayfish	*Austropotamobius pallipes*	Annex II, Annex V, WA	Pre 1988, Post 1988	N55, N65, N66
Common frog	*Rana temporaria*	Annex V, WA	Pre 1988, Post 1988	N55, N65, N66
Smooth Newt	*Lissotriton vulgaris*	WA	Post 1988	N65
West European Hedgehog	*Erinaceus europaeus*	WA	Pre 1988	N55
Irish Hare	*Lepus timidus subsp. Hibernicus*	Annex V, WA	Post 1988	N55, N65, N66
Badger	*Meles meles*	WA	Post 1988	N55
Otter	*Lutra lutra*	Annex II, Annex IV, WA	Pre 1988, Post 1988	N55, N65, N66

FPO = Flora Protection Order; RL = Red List, VU = Vulnerable, WA = Wildlife Act

6.3.1.7.4 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) website was conducted on the 10/08/2020 and again on the 4th of November 2021 and 23rd of February 2023. An updated search was undertaken on the 28th of February 2024. Records of protected flora and fauna (excluding birds) recorded from hectad N55, N65 and N66 are provided in Table 6-17. Records are presented as pre-1988 and post 1988. The time periods before and after the 1988 Baseline are presented to provide context of the protected species over time.

Table 6-17 NBDC records for species of conservation interest in hectad N55, N65 and N66.

Common name	Scientific name	Designation	Period	Hectad
Large white-moss	*Leucobryum glaucum*	HD Annex IV	Pre 1988	N55, N65
Marsh fritillary	*Euphydryas aurinia*	HD Annex II	Post 1988	N55, N65
Freshwater White-clawed Crayfish	*Austropotamobius pallipes*	HD Annex II, V, WA	Post 1988	N55, N66
Common frog	*Rana temporaria*	HD Annex V, WA	Post 1988	N55, N65
Brown long-eared bat	*Plecotus auritus*	HD Annex IV, WA	Post 1988	N55, N65, N66
Common pipistrelle	*Pipistrelle (Pipistrellus pipistrellus sensu lato)*	HD Annex IV, WA	Post 1988	N55, N65
Soprano Pipistrelle	Pipistrellus pygmaeus	HD Annex IV, WA	Post 1988	N55, N66
Daubenton's Bat	*Myotis daubentonii*	HD Annex IV, WA	Post 1988	N55, N66
Lesser Noctule	*Nyctalus leisleri*	HD Annex IV, WA	Post 1988	N55, N66
Otter	*Lutra lutra*	HD Annex V, WA	Post 1988	N55, N65, N66
Pine Marten	*Martes martes*	HD Annex II, V, WA	Post 1988	N55, N65, N66
Common lizard	*Zootoca vivipara*	WA	Post 1988	N66
Eurasian badger	*Meles meles*	WA	Post 1988	N55, N65, N66
Eurasian Pygmy shrew	*Sorex minutus*	WA	Post 1988	N55
Eurasian red squirrel	*Sciurus vulgaris*	WA	Post 1988	N55, N66
Irish hare	*Lepus timidus subsp. hibernicus*	WA	Post 1988	N55, N65, N66
Irish stoat	*Mustela erminea subsp. hibernica*	WA	Post 1988	N55
West European hedgehog	*Erinaceus europaeus*	WA	Post 1988	N55, N65, N66

HD = EU Habitats Directive; WA = Wildlife Acts (Ireland).

6.3.1.7.5 Bat Records

The National Bat Database of Ireland was searched for records of bat activity and roosts within a 1 km radius of the Application Site (IG Ref: E265605 N254031; last search (16/5/2024). The search yielded no results of roosts within a 1km radius of the Application Site. The search was extended to include a 10km radius including roosts, transects and ad-hoc observations. Five bat species were recorded within a 10km radius of the Application Site, Pipistrelle (*Pipistrellus pipistrellus*), Leisler's bat (*Nyctalus leisleri*), the Brown-eared Bat (*Plecotus auratus*), the Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Daubenton's Bat (*Myotis daubaentonii*). All bat records are from post 1988. Full details of the bat records are included in the Bat Report Summary in Appendix 6-2.

6.3.1.7.6 Freshwater Pearl Mussel (Margaritifera margaritifera)

The NPWS *Margaritifera* Sensitive Area map (Version 8, 2017) was consulted during the desk study. There is no surface water connectivity between the Application Site and any *Margaritifera* sensitive catchments shown on the *Margaritifera* Sensitive Area map.

6.3.1.7.7 Inland Fisheries Ireland Data

The IFI online database was reviewed for fish species records within the catchments downstream of the Application Site. The site drains into the River Boyne. It is located predominantly within the Boyne_SC_050 sub-catchment, with the southernmost section being located partially within the Boyne_SC_040 sub-catchment and a small part of the westernmost section located in the Deel (Raharney)_SC_010 sub-catchment.

Fish stock assessments were undertaken by IFI in 2014, post the 1988 baseline, for the River Boyne close to the river's source, approximately 1.5km north of Edenderry. Brown trout, stone loach and 3-spined stickleback were the only species recorded in 2014, with brown trout the most commonly encountered species

Species recorded during previous surveys in 2010 and 2009 included Brown trout (*Salmo trutta*), European eel (*Anguilla Anguilla)*, Lamprey spp (*Lampetra* sp.), Minnow *(Phoxinus phoxinus)*, Stone Loach *(Barbatula barbatula)* (Inland Fisheries Ireland, 2014).

The River Boyne is listed in the first schedule of the '*European Communities (Quality of Salmonid Waters) Regulations, 1988*' (S.I. No. 293) as a 'salmonid water'.

European eel (*Anguilla Anguilla*), is classified as 'critically endangered' in '*Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish'* (King *et al.,* 2011). Lamprey (*Lampetra* sp.) are classified as 'near threatened' in '*Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish'* (King *et al.,* 2011). All three species of Irelands lamprey are protected under Annex II of the EU habitats directive, with River Lamprey classified under Annex II and Annex V. Salmon (in freshwater) is listed on Annexes II and V of the EU Habitats Directive, and is listed as "Vulnerable," on King *et al.*'s Red list (2011).

6.3.1.7.8 Marsh Fritillary (Euphydryas aurinia)

There are NBDC records for march fritillary from the hectads N55 and N65 within which the Application Site is partially located. A number of records for this species are located within the Application Site at the southern end of Bracklin Bog, post the 1988 baseline. These records are dated from 2015. Records for marsh fritillary from the area surrounding the Application Site (hectads N55 and N65) range from pre-1970 to 2020.

In addition, NPWS Article 17 data also shows a number of records for marsh fritillary at the southern extent of Bracklin Bog which is located within the Application Site.

6.3.1.7.9 NPWS Article 17 Reporting

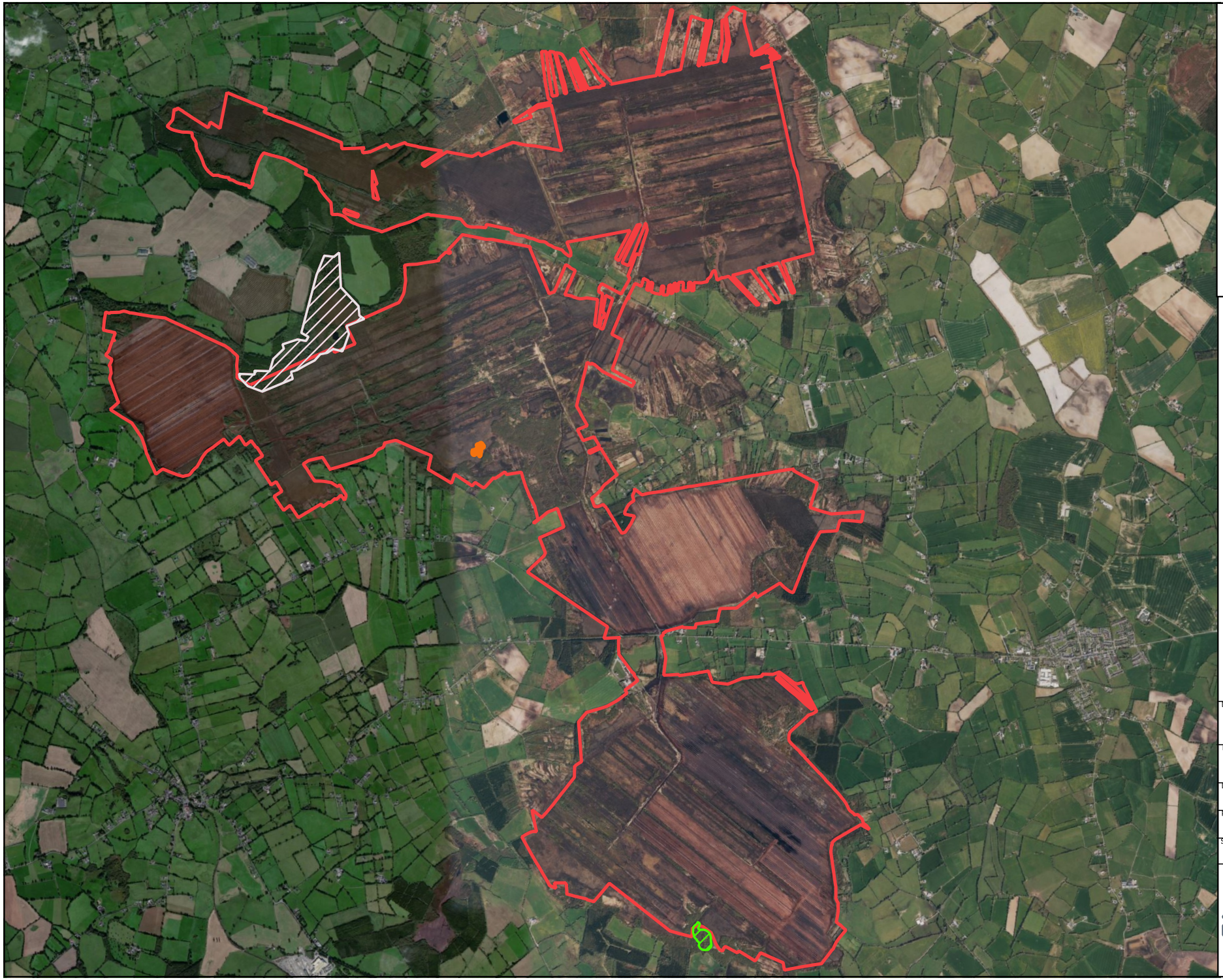
The most recent National Parks and Wildlife Service (NPWS, 2019) data on the recorded distribution of EU Habitats Directive Annex I listed habitats was reviewed in relation to the Application Site. This data is available in the form of the NPWS (2019) Article 17 reporting, and associated GIS data, on '*The Status of EU Protected Habitats and Species in Ireland*' (NPWS, 2019).

An area mapped as Active raised bog (7110) is present in an area of uncut raised bog at the southern extent of Bracklin Bog.

An area mapped as Annex I Alkaline fen (7230), Cladium fen (7210) and Transition mire (7140) in the Article 17 Habitats dataset is present to the north of Bracklin Bog. The majority of the mapped area lies outside of the Application Site boundary, however approximately 6ha of the southern edge of this mapped area is located partially within the Application Site boundary.

An area mapped as Annex I Old Oak Woodland 91A is present to the south-west of the Application Site, adjacent to Ballivor Bog. Although the majority of the mapped area is located outside of the Application Site boundary, a small section (approx. 0.12 hectares) of the northern edge of woodland is within the Application Site boundary.

The locations of these Annex I mapped habitats are shown on Figure 6-5. No other Annex I habitats are mapped within or in close proximity to the Application Site boundary.



Map Legend

- Prposed Development Site
- Active Raised Bog (7110)
- Alkaline Fens (7230), Calcareous Fens (7210), Transition Mires (7140)
- Old Oak Woodlands (9A01)

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Drawing Title

Article 17 Mapped Habitats

Project Title

Ballivor Substitute Consent Application

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DM	PD
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6.3.1.8 Invasive Species – 1988 Baseline

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of 'high impact' invasive species for hectads N55, N65 and N66 are provided in Table 6-18. Whilst no records are identified in 1988, records from before and after the 1988 Baseline are presented to provide context of the invasive species over time.

Table 6-18 NBDC records for invasive species (hectads N55, N65 and N66)

Common Name	Scientific Name	Period	Hectad
Canadian waterweed	*Elodea canadensis*	Post 1988	N55
Nuttall's waterweed	*Elodea nuttallii*	Post 1988	N55
Japanese knotweed	*Fallopia japonica*	Post 1988	N65
Rhododendron	*Rhododendron ponticum*	Post 1988	N65
Brown Rat	*Rattus norvegicus*	Post 1988	N55
Eastern Grey Squirrel	*Sciurus carolinensis*	Post 1988	N55, N66
American Mink	*Mustela vison*	Pre 1988, Post 1988	N55, N65, N66
Fallow deer	*Dama dama*	Post 1988	N65

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) include legislative measures to deal with the introduction, dispersal, dealing in and keeping of non-native species. Japanese knotweed (*fallopian japonica*), Rhododendron (*rhododendron ponticum*), Brown Rat (*Rattus norvegicus)* American Mink (*Mustela vison*) and Fallow Deer (*Dama dama)* are species subject to restrictions under Regulations 49 and 50 and are included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

6.3.1.9 Conclusions of the Desktop Study

The desktop study has provided information on the ecological baseline at the Application Site both as it was in 1988 and as it exists in the present day, using information gleaned from a variety of sources. It has also provided information on the ecology of the surrounding area with a focus on the Hectads N55, N65 and N66 within which the Application Site is located. Both historical and current records and information have been provided to assist in providing a comprehensive description of the ecology of the area.

In 1988, the majority of the Application Site had been drained, was undergoing peat extraction activities and all ancillary works and would have been dominated by bare peat at these locations. Where peat extraction had ceased for some time, the habitats would have comprised scrub, heath type vegetation, woodland and pioneer open cutaway habitats. Small areas of remnant uncut raised bog would have been present at Lisclogher West as well as mostly at the margins of the other bogs within the Application Site. The Application Site was likely utilised by bird species typical of cutover bog and associated habitats including meadow pipit and skylark. Faunal diversity in raised bog habitats is generally poor and therefore the Application Site in 1988 is unlikely to have supported a rich faunal diversity. However, it is likely that hare, badger, fox, otter, common frog and a range of invertebrates including marsh fritillary and large heath would have utilised parts of the Application Site.

Today, the habitats present within the Application Site comprise a mosaic of habitats which have recolonised the cutover bog including birch dominated woodland and scrub, ling heather dominated heath-type vegetation and pioneer open cutaway habitats including bog cotton dominated poor fen. Areas of remnant uncut raised bog are present, mostly at the bog margins. Conifer plantation, oak-ash-hazel woodland and areas of grassland also occur.

The Application Site drains into both the Deel (Raharney) to the west of the Application Site and the Stonyford River to the east, both of which in turn drain into the River Boyne downstream. All three watercourses are included within the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA designation. These European Sites are further considered in the Natura Impact Statement prepared for the assessment. There are a number of pNHAs located downstream of the Application Site via the River Boyne, however, these sites are located in excess of 20km (nearest site) downstream.

A review of Article 17 reporting identified a small area of mapped Annex I Active raised bog (7110) within the Application Site boundary. This is mapped within an area of uncut raised bog at the southern extent of Bracklin Bog. In addition, an area to the north of Bracklin Bog and outside the Application Site boundary was mapped as Annex I alkaline fen, cladium fen and transition mire. An area to the south-west of Ballivor Bog was mapped as old oak woodland and is located predominantly outside the Application Site boundary.

The desk study identified that a variety of protected faunal species are known to occur within and in the wider area surrounding the Application Site including bats, marsh fritillary, otter, badger and bird species. The mammal species records identified during the desk study informed the survey methodologies undertaken during the site visits. The mammal species recorded within the relevant hectads have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009[2]).

The Application Site is not located within a freshwater pearl mussel 'sensitive area'.

A number of bird species listed on Annex I of the EU Birds Directive and the BoCCI redlist have been recorded within the Application Site and surrounding area.

The desk study also provided useful information to inform the ecological surveys undertaken on the Application Site as well as the identification of pathways for potential impact on sensitive ecological receptors.

[2]*Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.*

6.3.2 Ecological Walkover Survey Results: 2011-2023

6.3.2.1 Description of Habitats and Flora within the Ecological Survey Area

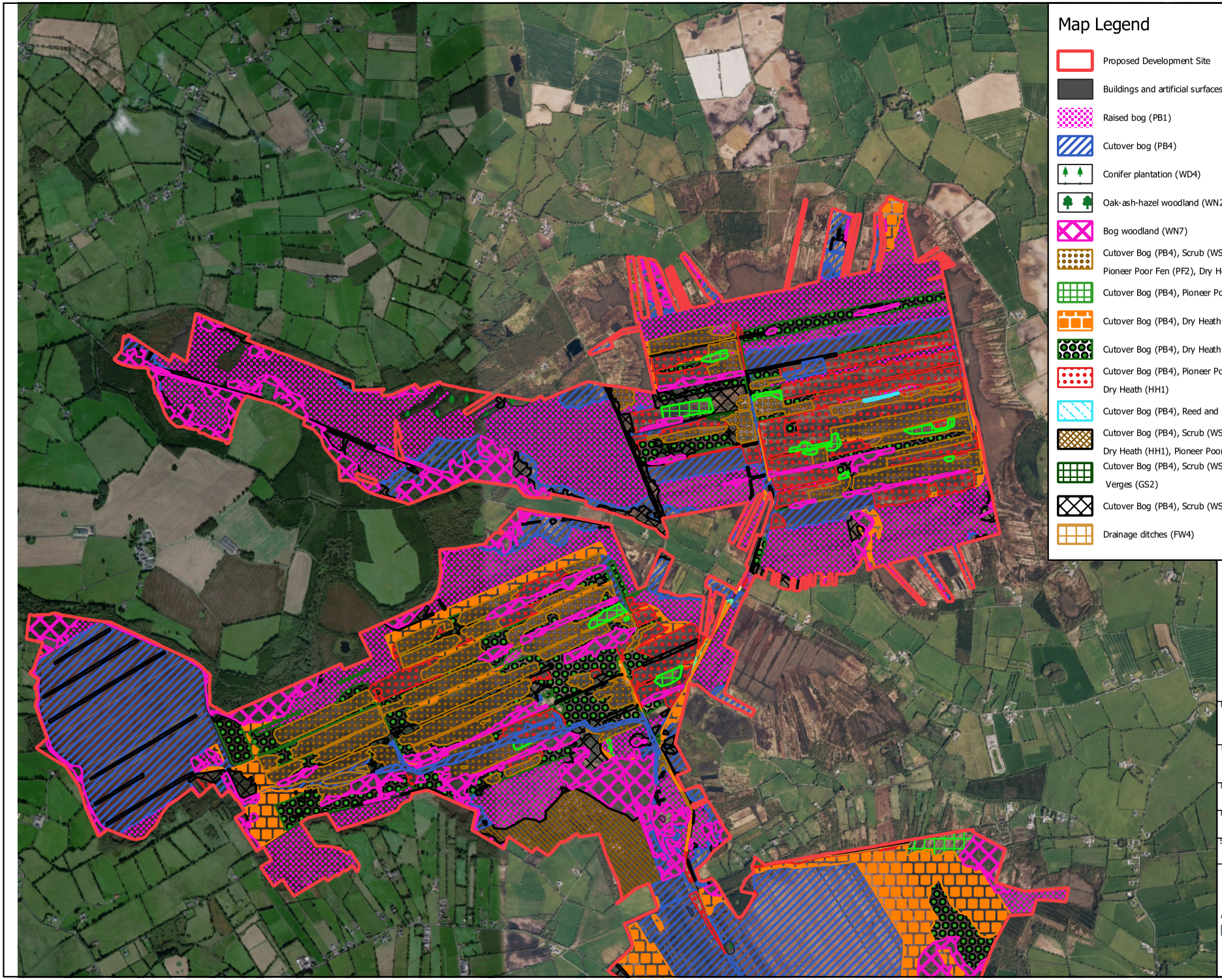
As outlined in Section 6.2.1, the habitats at the Application Site were the subject of a detailed survey and assessment by Bord na Móna ecologists between 2011 and 2012 and a detailed habitat map was produced of the Application Site. This habitat mapping and assessment was undertaken following the Bord na Móna habitat classification scheme and was cross referenced with '*A Guide to Habitats in Ireland*' (Fossitt, 2000).

Between 2020 and 2024, MKO ecologists visited the Application Site to ground-truth the results of the Bord na Móna habitat surveys and mapping and to undertake detailed habitat and botanical surveys. The habitat descriptions in this section are based on the walkover surveys and detailed vegetation surveys undertaken by MKO in 2021, 2022, 2023 and 2024.

The Application Site comprises four large cutover raised bogs classified as **Cutover Bog (PB4)** and one bog where drainage was installed but which was never subject to peat extraction (Lisclogher West) . Large areas of the cutover bog have been undergoing peat extraction until relatively recently (up to 2020) and are characterised by bare peat. Where peat extraction ceased on areas of the cutover bog for a significant period of time, i.e. since the late 80s and early 90s, these areas have since largely revegetated, primarily by dry heath type vegetation dominated by ling heather (*Calluna vulgaris*), birch (*Betula pubescens*) dominated scrub and woodland, pioneer poor fen communities characterised by common cottongrass (*Eriophorum angustifolium*) and small areas of grassland which occur mostly along the existing railway tracks traversing the Application Site. In some areas, particularly lower lying areas where drainage is impeded, embryonic bog communities dominated by common cottongrass and with a rich Sphagnum component have begun to form. The habitats described above occur in intimate mosaics within the Application Site as shown in the Habitat Maps in Figure 6-6a and Figure 6-6b, which show the location and relative cover of the habitats recorded within the Application Site at a high level. The habitats are described in greater details in the sections below.

In addition to the habitats of the cutover bog, there are also a number of small areas of remnant uncut raised bog at various locations throughout the Application Site, predominantly but not exclusively at the edges of the Application Site.

Waterbodies within the Application Site include a network of drainage ditches, small streams/watercourses classified as lowland depositing rivers, small areas of standing open water and artificial silt ponds. The watercourses including streams and drainage ditches provide hydrological connectivity with downstream EU and Nationally designated sites and are described in more detail below.



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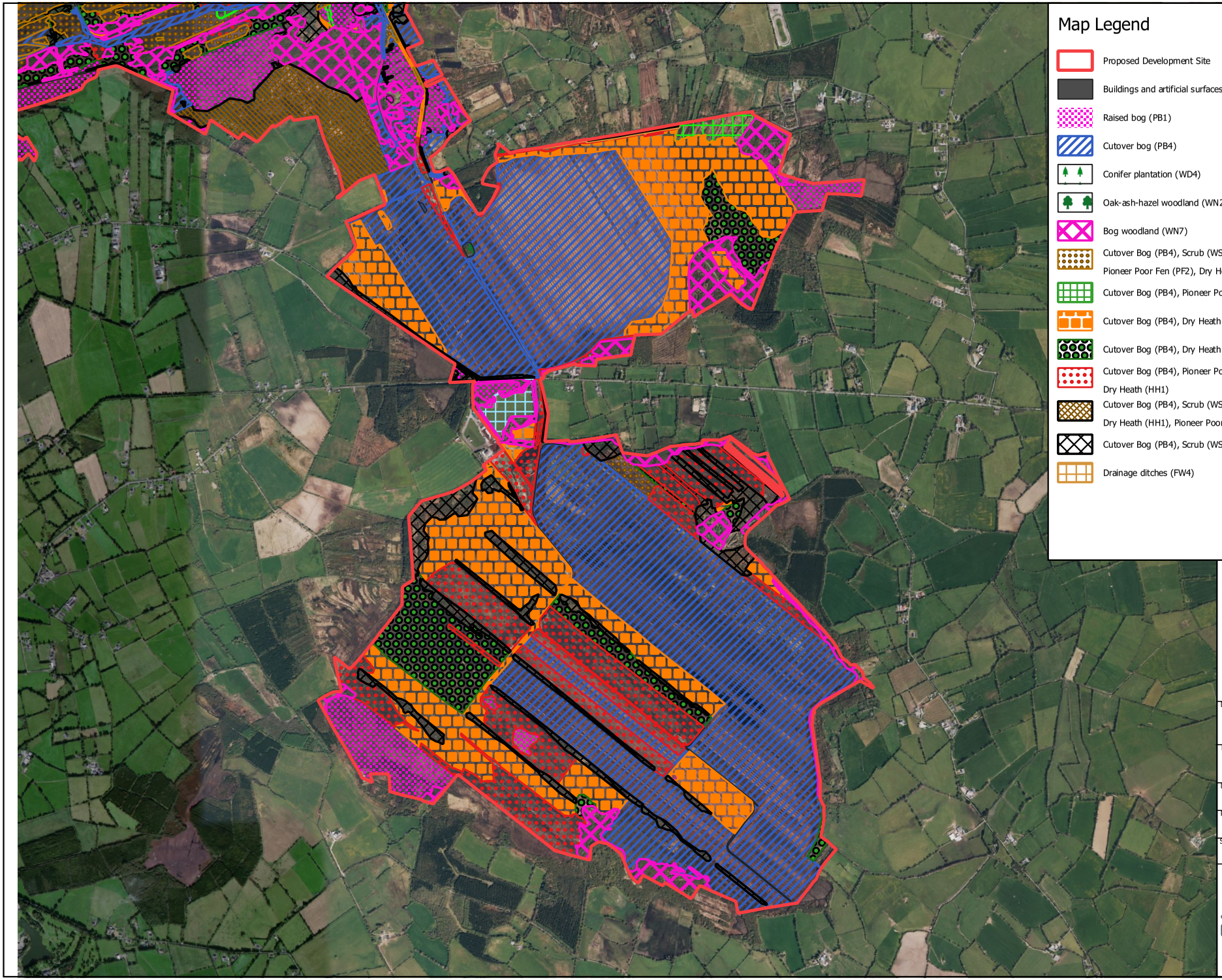
Habitat Map

Project Title

Ballivor Substitute Consent Application

Drawn By	Checked By
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Project No.	Drawing No.
191137-f	Figure 6-6 a
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Habitat Map

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Cutover Bog (PB4)

The vast majority of the Application Site, with the exception of Lisclogher West and small remnant sections of raised bog mainly around the peripheries of the Application Site, comprise of cutover raised bog or cutaway peat classified as **Cutover Bog (PB4)**. Where peat extraction recently ceased on large areas of the Application Site, e.g., Carranstown, the western extent of Bracklin Bog and much of Ballivor Bog, these areas are dominated by bare peat with little growth of vegetation (Plate 6-1). Where vegetation has begun to colonise relatively recently, areas consist of mosaics of bare peat and pioneer open cutaway communities, including pioneer ling heather (*Calluna vulgaris*) dominated Dry heath (HH1) vegetation and pioneer common cottongrass (*Eriophorum angustifolium*) dominated poor fen (PF2) or a mosaic of both.

Where peat extraction has ceased for some time, e.g. much of Bracklin Bog as well as southern extent of Ballivor Bog and Lisclogher, mosaics of well-established secondary dry heath and poor fen type communities as well as birch (*Betula pubescens*) dominated Scrub (WS1) and dry Bog woodland (WN7) are present.

A small number of areas of cutover bog within the Application Site, particularly those in low lying areas with impeded drainage, are relatively wet with some standing water and an abundant Sphagnum component in comparison to drier cutover habitats. These areas have been mapped as embryonic bog vegetation in Bord na Móna habitat surveys in 2011 and 2012 and often occur in associated with areas of standing water and poor fen and flush communities with abundant common cottongrass.

The following sub-sections provide a description of the secondary habitats that have begun to form on the cutover bog following cessation of peat extraction.



Plate 6-1 Cutover bog characterised predominantly by bare peat

Bog Woodland (WN7)

Birch dominated **Bog Woodland (WN7)** is common throughout the Application Site (Plate 6-2), most notably in Bracklin Bog where it occurs alongside birch dominated Scrub as one of the dominant habitats of the cutover bog. A large area of bog woodland is also present at the south-eastern section of Carranstown and smaller areas are present at various locations throughout Lisclogher and Ballivor Bogs.

Bog woodland within the Application Site is generally dominated by downy birch (*Betula pubescens*) with some willows (*Salix* sp.), and occasional lodgepole pine (*Pinus contorta*), rowan (*Sorbus aucuparia*) and sitka spruce (*Picea sitchensis*). The shrub layer is mostly dominated by brambles (*Rubus fruticosus agg.*) with ivy (*Hedera helix*) and bracken (*Pteridium aquilinum*) also occurring frequently and bilberry (*Vaccinium myrtillus*) occasionally. Ground flora frequently included wild strawberry (*Fragaria vesca*) and occasionally field woodrush (*Luzula sylvatica*), purple moor grass (*Molinia caerulea*), soft rush (*Juncus effusus*) and hart's tongue fern (*Asplenium scolopendrium*). The areas of bog woodland were mostly dry underfoot with little to no Sphagnum cover and did not conform to Annex I Bog Woodland (91DO). Bryophytes recorded typically included *Thuidium tamariscinum* and *Hypnum jutlandicum*. Areas of bog woodland within the Application Site are generally small in size, often comprising wide linear strips running parallel to drainage ditches, however larger more extensive areas of bog woodland are present in some areas, including at the southern and northern ends of Bracklin Bog, at the southern end of Ballivor Bog and at the eastern extent of Carranstown Bog. The Annex I Bog Woodland habitat (91DO) was not recorded on the Application Site during the Bord na Móna habitat surveys in 2011 and 2012 or during the detailed habitat surveys undertaken by MKO.



Plate 6-2 Area of birch dominated bog woodland at Bracklin Bog

Scrub (WS1)

Birch dominated **Scrub (WS1)** is also common throughout the Application Site, where it has developed on drier areas of the cutover bog (Plate 6-3). Scrub is generally dominated by downy birch, along with willow species. The ground flora is generally comprised of ling heather (*Calluna vulgaris*), purple moor grass (*Molinia caerulea*) and common cottongrass (*Eriophorum angustifolium*). Scrub habitat within the Application Site often forms mosaics with heath-type vegetation described below. Where scrub was greater than 4 metres in height, it was classified as Bog Woodland (as per Fossitt, 2000).



Plate 6-3 Example of birch dominated scrub in the background

Cutover bog supporting Secondary dry heath (HH1) type communities

This habitat type covers a broad range of conditions from bare peat and dry but vegetated peat to much wetter areas that grade into poor fen (Plate 6-4 – Plate 6-7). The habitat frequently occurred in a mosaic alongside other habitats including scrub and pioneer poor fen habitat.

Secondary dry heath (HH1) type communities throughout the Application Site are largely dominated by ling heather (*Calluna vulgaris*) along with common cottongrass (*Eriophorum angustifolium*) on dry peats with little to no Sphagnum present. Areas of bare peat are common, particularly where the cutover bog has begun to revegetate more recently. Cross-leaved heath (*Erica tetralix*), hare's tail cottongrass (*Eriophorum vaginatum*) and purple moor grass are also frequent components of the vegetation of these communities and occasional birch and self-seeded lodgepole pine and/or larch saplings are also common.

Wetter areas are characterised by a greater abundance of common cottongrass and also supported occasional deergrass (*Trichophorum germanicum*) and bog asphodel (*Narthecium ossifragum*). These areas occasionally graded into poor fen.

According to Smith and Crowley (2020) cutover bogs should only rarely be considered examples of dry siliceous heath (HH1) or wet heath (HH3). These habitats are defined by peat depths of <0.5m which rarely occur on cutover bog. *Only where a habitat is underlain by shallow peat and good indicators of heath are present, such as Carex binervis, Galium saxatile and Juncus squarrosus, should heath habitats be considered for cutover bog.* The vast majority of heath and heath mosaic habitat within the Application Site occurs on peat with a depth of >0.5m and none of these heath indicator species were recorded within heath habitat during the field surveys undertaken. Therefore, the secondary heath type communities within the Application Site do not conform to Annex I heath habitats. They are secondary, cutover raised bog habitats that are located on deep peat and level ground. They do not conform to Annex I Wet Heath habitat as defined by the Irish Wildlife Manual (Perrin et.al. 2014). Neither do they conform to Annex I Raised Bog habitats or any other Annex I habitat.



Plate 6-4 Dry heath type vegetation with areas of bare peat and encroaching scrub at Lisclogher Bog



Plate 6-5 Example of dry heath type vegetation on cutover bog characterised predominantly by ling heather with common cottongrass and areas of bare peat



Plate 6-6 Dry ling heather dominated dry heath type vegetation in the foreground grading into wetter common cottongrass dominated vegetation in the background at Ballivor Bog.



Plate 6-7 Mosaic of ling heather dominated dry heath and scrub at Bracklin Bog

Poor Fen (PF2)

This habitat occurs within the Application Site predominantly as pioneer poor fen vegetation with established poor fen and flush being less common within the Application Site.

Many sections of the Application Site supported cutaway bog characterised by pioneer common cottongrass dominated Poor fen (PF2) communities, most notably Lisclogher and Bracklin Bogs. This is one of the first vegetation communities to colonise bare peat following cessation of peat extraction. The habitat was widespread but highly variable mostly occurring as a habitat mosaic along with bare peat, dry heath type vegetation and scrub (Plate 6-8).

Wetter sections of the cutover bog associated with areas of standing water and with a more established poor fen vegetation are also present throughout the Application Site. These areas are dominated by common cottongrass with soft rush (*Juncus effusus*) and *Sphagnum cuspidatum* also present (Plate 6-9) These areas also supported abundant purple moor grass and hummocks of the moss *Polytrichum commune,* whilst the wettest areas with pools of standing water were characterised *by* bottle sedge (*Carex rostrata*) alongside marsh pennywort (*Hydrocotyle vulgaris*), heath bedstraw (*Galium saxatile*), cuckoo flower (*Cardamine pratensis*) and occasional willow (*Salix* sp.) saplings (Plate 6-10).



Plate 6-8 Pioneer common cottongrass dominated poor fen vegetation forming a mosaic with scrub and heath type vegetation at Lisclogher Bog

.



Plate 6-9 Area of common cottongrass dominated poor fen at Bracklin Bog



Plate 6-10 Example of poor fen with bottle sedge at Lisclogher Bog

6.3.2.1.2 Open water

No significant areas of permanent open water are present within the Application Site.

Numerous smaller areas of open water are present in the wettest and lower lying areas of the Application Site, often associated with poor fen and flush communities (Plate 6-11). These areas have previously been subject to peat extraction and are often revegetating with bottle sedge (*Carex rostrata*) and common cottongrass. Areas of standing water were also recorded in association with low lying regenerating areas of cutaway bog where embryonic Sphagnum communities were beginning to establish comprising abundant *Sphagnum cuspidatum* and common cottongrass.



Plate 6-11 Small area of open water associated with poor fen and flush vegetation

Other Artificial Lakes and Ponds

Silt ponds are present at various locations throughout the Application Site and have been classified as Other Artificial lakes and Ponds (FL8). Drainage ditches throughout the Application Site are directed to these silt ponds prior to discharge from the Application Site.

Drainage Channels (FW4)

The Application Site is extensively drained with channels that run through the Application Site. Drainage ditches ranged from approximately 0.3m in width to approximately 3m in width. Whilst many of the drains within the Application Site have a poor structure and were devoid of vegetation, common components of vegetated drains included bulrush (*Typha latifolia*), horsetails (*Equisetum* sp.), willowherbs (*Epilobium* sp.), hard rush (*Juncus effusus*), and occasionally floating vegetation such as pondweeds. Substrates were predominantly silt/peat. In the areas where the drains are surrounded by heath, scrub and woodland the vegetation within them is sparse and the substrate comprises of bare silt (Plate 6-12 - Plate 6-13).



Plate 6-12 Drainage ditch through an area of birch woodland



Plate 6-13 Example of typical drainage ditch within the Application Site

Lowland depositing streams (FW2)

The Application Site is drained by a number of watercourses within and surrounding the Application Site including the Cartenstown stream, Stonestown river, Ballinn stream, Bolandstown river, Woodtown West stream, Stonyford river, Carranstown Little river, Killaconnigan stream, Kilballivor stream, Ballivor river and two unnamed tributaries, Graffanstown stream, Ballynaskeagh Stream, Mucklin Stream, River Deel, Craddanstown stream and Clondalee More stream.

The Deel (Raharney) river is located approximately 800m to the west of the Application Site and the Stonyford River is located approximately 450m to the east of the Application Site. Both rivers are designated as the River Boyne and River Blackwater SAC. A number of the streams within and adjacent to the Application Site discharge to these rivers which in turn discharge to the River Boyne downstream of the Application Site.

6.3.2.1.3 *Grasslands Habitats*

Dry calcareous and neutral grassland (GS1) and Dry meadows and grassy verges (GS2)

Small areas of dry grassland are present within the Application Site, along the sides of the railway lines and existing track verges as well as in areas where underlying glacial till has been exposed (Plate 6-14). The majority of grassland areas are classified as Dry Meadows and Grassy Verges (GS2) with grass species including Yorkshire fog (*Holcus lanatus*), cocks foot (*Dactylis glomerata),* sweet vernal grass (*Anthoxanthum odoratum*) and false oat grass (*Arrhenatherum elatius*). Encroaching scrub was common comprising bramble (*Rubus fruticosus* agg.) and bilberry (*Vaccinium myrtillus*). Other species recorded include bird's foot trefoil (*Lotus corniculatus*), knapweed (*Centaurea nigra*), meadowsweet (*Filipendula ulmaria*), tormentil (*Potentilla erecta*), ribwort plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*), germander speedwell (*Veronica chamaedrys*) and occasional devil's bit scabious (*Succisa pratensis*). Smaller areas of Dry calcareous and neutral grassland (GS1) were also present throughout the Application Site.

A number of orchid species were recorded in grassy verges along the existing railway lines including twayblade (*Listera ovata*), heath spotted orchid (*Dactylorhiza maculata*), common spotted orchid (*Dactylorhiza fuchsii*) and butterfly orchid (*Platanthera* sp.). Marsh helleborine (*Epipactis palustris*) is also known to occur at the Application Site in small pockets of calcareous grassland.

Other areas grassland habitats comprised of a mix of species typical of both calcareous and peatland habitats. This diversity in species recorded has resulted from the importing of stone for the construction of railway tracks throughout the peatland.



Plate 6-14 Example of dry grassland adjacent to the railway line within the Application Site

Grassland Habitats: Improved agricultural grassland (GA1), Wet grassland (GS4), Amenity Grassland (GA2)

The Application Site is surrounded by agricultural fields classified as Improved agricultural grassland (GA1) and Wet grassland (GS4). Small areas of Improved agricultural grassland are present in the Application Site boundary, close to the entrance to Ballivor Bog at its northern extent and at the southern extent of Lisclogher. The fields are characterised by species including perennial rye grass (*Lolium perenne*), cocksfoot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), common sorrel (*Rumex acetosa*), broadleaved dock (*Rumex obtusifolius*), and dandelion (*Taraxacum officinale*).

Wet grassland occurs mainly around the edges of the Application Site associated with wetter agricultural fields with abundant soft rush (*Juncus effusus*). Small areas of wet grassland dominated by purple moor grass are also present throughout the Application Site on cutover bog, however, these areas occur predominantly as a habitat mosaic alongside scrub and dry heath type communities.

A small area of Amenity grassland (GA2) is present at the northern extent of Ballivor Bog in the built area around Ballivor Works (adjacent to the Application Site boundary).

6.3.2.1.4 Oak-ash-hazel woodland (WN2)

Two small mineral islands are located on the Carranstown Bog site; these areas contain woodland that is dominated by Hazel (*Corylus avellana*), downy birch and ash (*Fraxinus excelsior*) with smaller amounts of young oak (*Quercus robur*) and are classified as Oak-ash-hazel woodland.

A small woodland copse area with elements of oak-ash-hazel woodland is also present at Bracklin Bog where it has developed on a mound close to the remains of an old Famine House (Plate 6-15). There are several mature Sycamore (*Acer pseudoplatanus*) trees around the house forming the woodland copse. Other species present include hazel (*Coryllus avelana*), holly (*Ilex aquifolium*), hawthorn (*Crataegus monogyna*) and ash (*Fraxinus excelsior*).



Plate 6-15 Oak-ash-hazel woodland close to the remnants of the Famine House at Bracklin Bog

6.3.2.1.5 Uncut raised bog

There are a number of areas of remnant uncut raised bog habitats within the Application Site boundary (Plate 6-16 and Plate 6-17). These are classified as **Raised Bog (PB1).**

Whilst many areas of remnant raised bog recorded within the Application Site are typically small in area and are very dry with little to no Sphagnum cover, others are in relatively good condition, slightly wetter and support a more diverse raised bog vegetation with a greater abundance and cover of *Sphagnum* species.

Some areas of remnant raised bog had been subject to previous extensive drainage measures, with several parallel drainage channels throughout, but never put into peat extraction and as a result these areas are extremely dry e.g. large areas of Lisclogher West and the norther and southern sections of Lisclogher East. Other sections of remnant raised bog at Lisclogher Bog and Bracklin Bog had also been burned in recent years, see Chapter 4 for details, and, although recovering, still remained relatively dry and degraded.

The driest, drained areas of remnant raised bog within the Application Site are generally dominated almost exclusively by ling heather. Other species recorded in the drier raised bog remnants include *Cladonia* sp., cross leaved heath (*Erica tetralix*), cottongrasses and deergrass (*Trichphorum germanicum*). These dry areas were characterised by very low and in some cases no *Sphagnum* cover and variable areas of bare ground.

The wettest areas of remnant raised bog support bog asphodel (*Narthecium ossifragum*), areas of white beak sedge (*Rhychospora alba*) and a greater abundance and cover of *Sphagnum* species. However, in general, Sphagnum cover did not exceed 30% cover and was more typically < 10% cover. These wetter areas were not characterised by standing water/pools and were not associated with lawns of *Sphagnum*.

According to the Article 17 report referred to in Section 6.3.1.7.9, Active Raised Bog (ARB) '*is characterised by the presence of an acrotelm, which is defined as the living, actively growing upper layer of a raised bog, the surface of which is composed mainly of living bog mosses (Sphagnum species)*'. In addition, as outlined in Smith and Crowley (2020), previous raised bog research in Ireland indicated that ARB, at least in the midlands, generally supports cover of Sphagnum greater than 40% (Fernandez Valverde et al. 2005, 2012). The raised bog remnants within the Application Site generally lacked a diverse or abundant Sphagnum component. Sphagnum cover was generally <40% or in the driest areas absent. In raised bog remnants with >40% Sphagnum cover, typical Raised bog microtopography, including hummocks, bog pools and Sphagnum lawns were absent from these habitats. The areas of remnant raised bog within the Application Site, given their highly degraded and fragmented nature, and absence of typical raised bog micro-topography, do not conform to the Annex I habitat Active Raised Bog [7110].

According to the above Article 17 report, Degraded Raised Bog (DRB) is characterised by the complete absence, or at best the presence of only a patchy thin cover of an 'acrotelm' layer. According to the report, while previously all the vegetated areas of high bog which were not delineated as Active Raised Bog (ARB) were classified as DRB, on the assumption that most of it could be restored to active peat-forming condition after implementation of comprehensive restoration works, the results of recent research show that only those areas with the right combination of physical conditions (including surface shape, slope and drainage patterns) ultimately capable of supporting ARB are now considered DRB. To qualify as DRB, these areas must still be capable of natural regeneration to active bog within 30 years if their hydrology is repaired (usually after restoration works, particularly blocking of drains).

The conditions outlined in the Article 17 report as being suitable for supporting DRB include:

> *'a) sites over 30ha of high bog with typical bog vegetation which were part of a larger bog and contain drains which could be blocked and b) smaller sites (< 30 ha) which are part of small basins with drains present which could be blocked.....The occurrence of DRB is ruled out from those sites where the high bog area is below 30ha, which were once part of a much larger site and are now surrounded by facebanks and without drains to be blocked.'*

The majority of raised bog remnants within the Application Site are <30ha in size. However, those >30ha in size and which support >40% Sphagnum cover, e.g. the area of uncut remnant raised bog at Lisclogher West, are considered to conform to the Annex I habitat Degraded Raised Bog still capable of Natural Regeneration (7120).

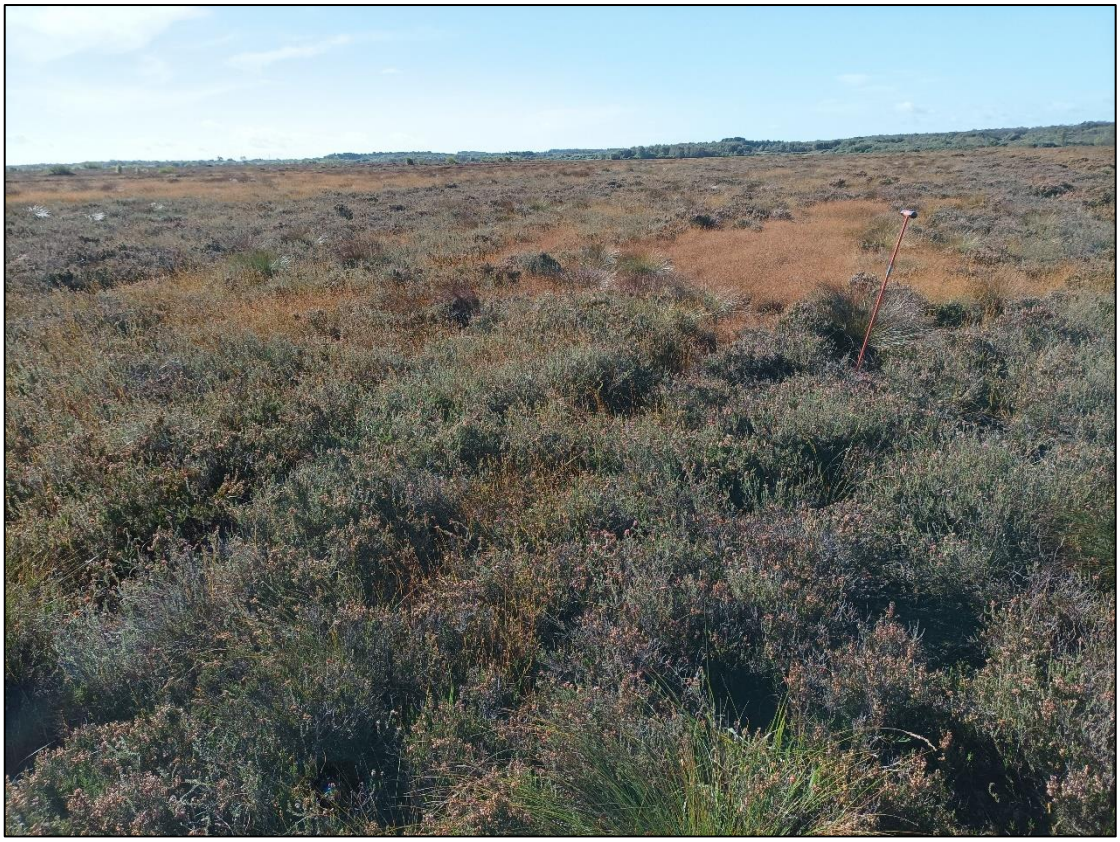


Plate 6-16 Example of uncut but drained and dry raised bog at Bracklin Bog



Plate 6-17 Example of uncut remnant raised bog within the Application Site

6.3.2.1.6 Conifer Plantation

Small areas of conifer plantation (WD4) are present at the very northern extent of Ballivor Bog within the Application Site. A larger area of conifer plantation is also present along the northern boundary of Lisclogher West Bog within the Application Site.

6.3.2.1.7 Spoil and bare ground (ED2) and Recolonising bare ground (ED3)

Existing unpaved access tracks throughout the Application Site (Plate 6-21) are classified as Spoil and bare ground (ED2). Areas of spoil and bare ground and recolonising bare ground are also present in works areas associated with the Bord na Móna buildings at the northern extent of Ballivor Bog.



Plate 6-18 Access track at Bracklin Bog classified as Spoil and bare ground

6.3.2.1.8 Buildings and Artificial Surfaces (BL3)

There are some areas classified as buildings and artificial surfaces (BL3) within the Application Site. The majority of the artificial surfaces are associated with the Ballivor Works (adjacent to the Application Site), and the railway infrastructure (Plate 6-14) and existing local roads throughout the Application Site.

6.3.2.1.9 Protected Flora

No botanical species protected under the Flora (protection) Order (1999, as amended 2015) were recorded during the surveys undertaken.

6.3.2.1.10 Invasive species

No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the Application Site during the walkover surveys.

6.3.2.2 Evaluation of habitats

1988 baseline

As much of the Application Site would have been drained by the 1988 baseline and characterised by dominant cutover bog, the habitats present then would have been similar to those present today, predominantly cutover bog with sections of remnant raised bog and oak-ash-hazel woodland. The cutover bog habitat at the Application Site would have comprised predominantly of bare peat where large sections of the bogs had been drained and vegetation removed. The ecological evaluations provided below for the current habitats within the Application Site would have been the same.

Current habitats

Ecological evaluation follows a methodology that is set out in Chapter 3 of the '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*' (TII, 2009). The habitats within and adjacent to the Application Site were evaluated in accordance with the criteria developed by the TII (2009b), which classifies sites in terms of their ecological importance, *i.e.* '*international importance*', '*national importance*', '*county importance*', '*local importance (higher value)*' or '*local importance (lower value)*'.

Following the extensive surveys that were undertaken, it is concluded that the habitats of highest ecological significance within the Application Site are those that are most closely associated with the remnant fragmented areas of raised bog habitat. The areas of remnant raised bog habitat, as shown in the habitat maps in Figure 6-6a and Figure 6-6b, have been assigned **County significance** as they contain the only remaining examples of Raised Bog habitat in the area and although predominantly degraded and dry, some areas of remnant raised bog, particularly at Lisclogher West, have potential to correspond to the Annex I habitat '*Degraded raised bog still capable of natural regeneration*' . These areas are only a small remnant of the entire area of raised bog that would have dominated the Application Site. Uncut raised bog habitat would have dominated the entire Application Site prior to the commencement of the peat extraction activities and all ancillary works. Large sections of remnant raised bog within the Application Site have been subject to drainage, including those areas of raised bog at the northern extents of Lisclogher and Bracklin Bogs as well as Lisclogher West. Other large areas of remnant bog have been damaged by fire including an area of remnant raised bog in Bracklin Bog as well as the area of remnant raised bog at the northern extent of Lisclogher. The vast majority of the areas of remnant bog within the Application Site are small in size, degraded, largely dry underfoot and with little to no Sphagnum cover, however, there are wetter areas of remnant raised bog at locations throughout the site and Lisclogher West is comprised predominantly of uncut, remnant raised bog.

Cutover bog and the secondary habitats recorded on the cutaway sections of the Application Site including bog woodland and scrub, mosaics of dry heath type vegetation and poor fen with some open water habitats and embryonic Sphagnum communities are assigned **Local importance (Higher Value)**. This is on the basis that they consist of a large area of semi-natural habitats with a high biodiversity value in the local context but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive. The bog woodland within the Application Site is generally dry underfoot with little to no Sphagnum cover and does not correspond to the Annex I habitat Bog woodland (91D0). In Ireland there is currently no recognition or definition of Annex I Active Raised Bog (7110) on cutover raised bog. NPWS (2019) states '*Although ARB is currently described as confined to the high bog,*

surveys in recent years have indicated the occurrence of peat-forming vegetation on cutover areas at some sites. These areas occasionally correspond to regenerating ombrotrophic vegetation characterised by Sphagnum cover greater than 40–50%, but they generally lack the diversity and abundance of Sphagnum species, micro-topographical features and good quality indicators associated with ARB. These cutover areas have the capacity to develop into embryonic ARB but longer time periods (50-100 years) are likely to be required for high quality ARB to develop'. The majority of the cutover habitats within the Application Site generally did not support high *Sphagnum* cover (40% or more) and where Sphagnum was abundant on cutover habitats, the habitats lacked other indicator species and microtopographical features associated with active raised bog.

The bare peat habitats and drainage ditches throughout the Application Site are of low ecological significance in their current state and have been assigned **Local Importance (Lower Value).** However, following cessation of peat extraction, the bare peat habitats will inevitably revegetate in a similar manner to the rest of the Application Site. Small natural watercourses, including streams and rivers draining the Application Site have been assigned **Local importance (Higher value).**

No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the Application Site and no suitable habitat occurs within the Application Site. All species recorded are common in the Irish landscape.

6.3.2.3 Fauna in the Existing Environment

Dedicated faunal walkover surveys were undertaken throughout 2020, 2021, 2022, 2023, and 2024.

6.3.2.3.1 *Badger*

Two badger setts were recorded within the Application Site during surveys undertaken. One, located in an area of woodland at the north-eastern extent of Bracklin Bog within the Application Site, comprised of a single entrance sett. A camera trap was deployed at the sett entrance for a period of 7 days from the 8th July 2021 to the 15th July 2021. No evidence of badger entering or exiting the sett was recorded.

A second sett was recorded at Carranstown Bog within the Application Site in an area of woodland/scrub (Plate 6-19). This comprised a main sett with 5 entrances and a single entrance located approximately 200m to the north of the main sett, considered to be an outlier sett (as per Smal, (1995)[3]) all of which showed signs of recent use by badger including badger hairs, foraging evidence and paths.

The locations of the setts are shown in Figure 6-2, included in confidential Appendix 6-4.

[3] *Smal, C. (1995) The Badger and Habitat Survey of Ireland. Unpublished Report to the Department of Agriculture and the National Parks & Wildlife Service.*



Plate 6-19 Badger sett entrance at Carranstown Bog

6.3.2.3.2 Otter

No otter resting or breeding sites were recorded within the Application Site during dedicated otter surveys undertaken by MKO. Neither were any otter resting or breeding sites recorded during the aquatic surveys of the watercourses downstream of the Application Site undertaken by Triturus Environmental Ltd.

Otter spraints were recorded within the Application Site in proximity to a drainage ditch in Lisclogher Bog during the multi-disciplinary walkover surveys undertaken in May 2020. Otter prints were recorded within the Application Site in Lisclogher Bog, in proximity to a wide drainage ditch during dedicated otter surveys undertaken in May 2021. No other signs of this species were recorded.

Signs of otter (spraints and/or prints) were recorded outside of and downstream of the Application Site in the Craddanstown stream to the west of Ballivor Bog and in the Ballivor river to the east of Ballivor Bog during the aquatic surveys of these watercourses undertaken by Triturus Environmental Ltd.

The majority of the drainage ditches within the Application Site are small and are thus not suitable for otter given their small size and highly modified channels of low fisheries value, however it is possible that otter utilise some of the larger drains for foraging and commuting. The main watercourse/larger artificial drainage channels were assessed as providing suitable commuting and foraging habitat for the species.

6.3.2.3.3 Bats

The results of bats surveys undertaken at the Application Site are described in full in the Bat Report Summary in Appendix 6-2 and summarised below.

Roost surveys

No bat roosts were identified within the Application Site during the surveys undertaken in 2020 and 2022.

Manual transects

Manual transects were undertaken in Spring, Summer, and Autumn 2022. Bat activity was recorded on all surveys. Bat activity was recorded on all surveys, a total of 108 bat passes were recorded. In general, Common pipistrelle was recorded most frequently (n=96), followed by Leisler's bat (8) and Soprano pipistrelle (n=4). Low activity was recorded across the Application Site. Species composition and activity levels did not vary significantly between surveys.

Species composition and activity levels varied significantly between surveys. Transect survey results were calculated as bat passes per km surveyed (to account for differences in survey effort).

Ground-level Static Surveys

In total, 44,101 bat passes were recorded across all deployments during 2022. In general, Common pipistrelle (n=24,670) occurred most frequently, followed by Soprano pipistrelle (n=11,871) and Leisler's bat (n=6,711). Instances of *Myotis* spp. (n=645), Brown long-eared bat (n=192) were significantly less and Nathusius' pipistrelle (n=12) were rare.

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. Species composition was similar across seasons, however relative activity was high in Summer, low in Spring and very low in Autumn. No instances of Nathusius' pipistrelle were recorded in Autumn, and activity by all other species declined relative to Spring and Summer. In terms of total passes, Brown long-eared bat activity remained constant between Summer and Autumn, and *Myotis* spp. activity slightly increased between seasons through the year.

Spring activity was dominated by Leisler's bats at most detectors, with activity overall being low for all species (<10bpph), with a few exceptions. All detectors presented low median activity in spring (<10bpph).

Summer activity was largely dominated by Common pipistrelles at most detectors, with some detectors (refer to bat report in Appendix 6-2) presenting slightly higher Leisler's bat activity, with low bpph recorded.

In Autumn, median bat activity was low at all detectors and for all species recorded. Species composition was more variable in Autumn at detectors.

6.3.2.3.4 Birds

A comprehensive list of all bird species recorded during bird surveys undertaken at the Application Site by MKO from 2020 to 2023 is included in Appendix 6-5. The species recorded within the Application Site were predominantly species typical of the cutover bog and surrounding habitats in the wider area. Woodcock was recorded breeding within the Application Site. While golden plover and curlew were recorded within the Application Site these species were not using the Application Site for

breeding. Kingfisher was observed flying through the site on a number of occasions and red grouse was observed on one occasion. Full details of the results of the bird surveys are included in Appendix 6-5.

6.3.2.3.5 Reptiles and Amphibians

Common frog (*Rana temporaria*) was recorded on a number of occasions throughout the Application Site. The species is likely to breed in small wetland areas within the Application Site. Smooth newt (*Lissotriton vulgaris*) was recorded during aquatic surveys on the Woodttown stream, downstream of the site boundary at Lisclogher. Common lizard (*Zootoca vivipara*) while not recorded during the site visits, are likely to occur within the Application Site.

6.3.2.3.6 Fisheries and Aquatic Fauna

The results of Aquatic surveys undertaken by Triturus Environmental Ltd. are described in full in the aquatic report in Appendix 6-3.

In summary, the majority of watercourses in the vicinity of the Application Site were of local importance (higher value) in terms of their aquatic ecology. Watercourses included the Cartenstown Stream (EPA code: 07C60), Stonestown River (07S11), Ballinn Stream (07B47), Bolandstown River (07B45), Woodtown West Stream (07W06), Carranstown Little River (07C87), Killaconnigan Stream (07K34), Kilballivor Stream (07B35), Ballivor River (07B52) and two unnamed tributaries, Graffanstown Stream (07G10), Ballynaskeagh Stream (07B24), Mucklin Stream (07M13), Craddanstown Stream (07C550) and Clondalee More Stream (07C77). Typically, larger watercourses with higher flow rates are better able to buffer against any impacts associated with the historical drainage and ongoing peat escapement, and these proved the better-quality aquatic habitat, i.e. Stonyford River, River Deel, River Boyne which are located outside and downstream of the Application Site. With the exception of survey sites on these three watercourses, biological water quality was of ≤Q3 (poor status) across all survey sites sampled and this contributed to the reduction in habitat quality for salmonids, macro-invertebrates (including white-clawed crayfish) and other aquatic species and habitats of conservation value. The Stonyford River, River Deel and the River Boyne all of which are located downstream of the site provide suitable habitat for a range of aquatic species including salmonids, freshwater crayfish and European eel.

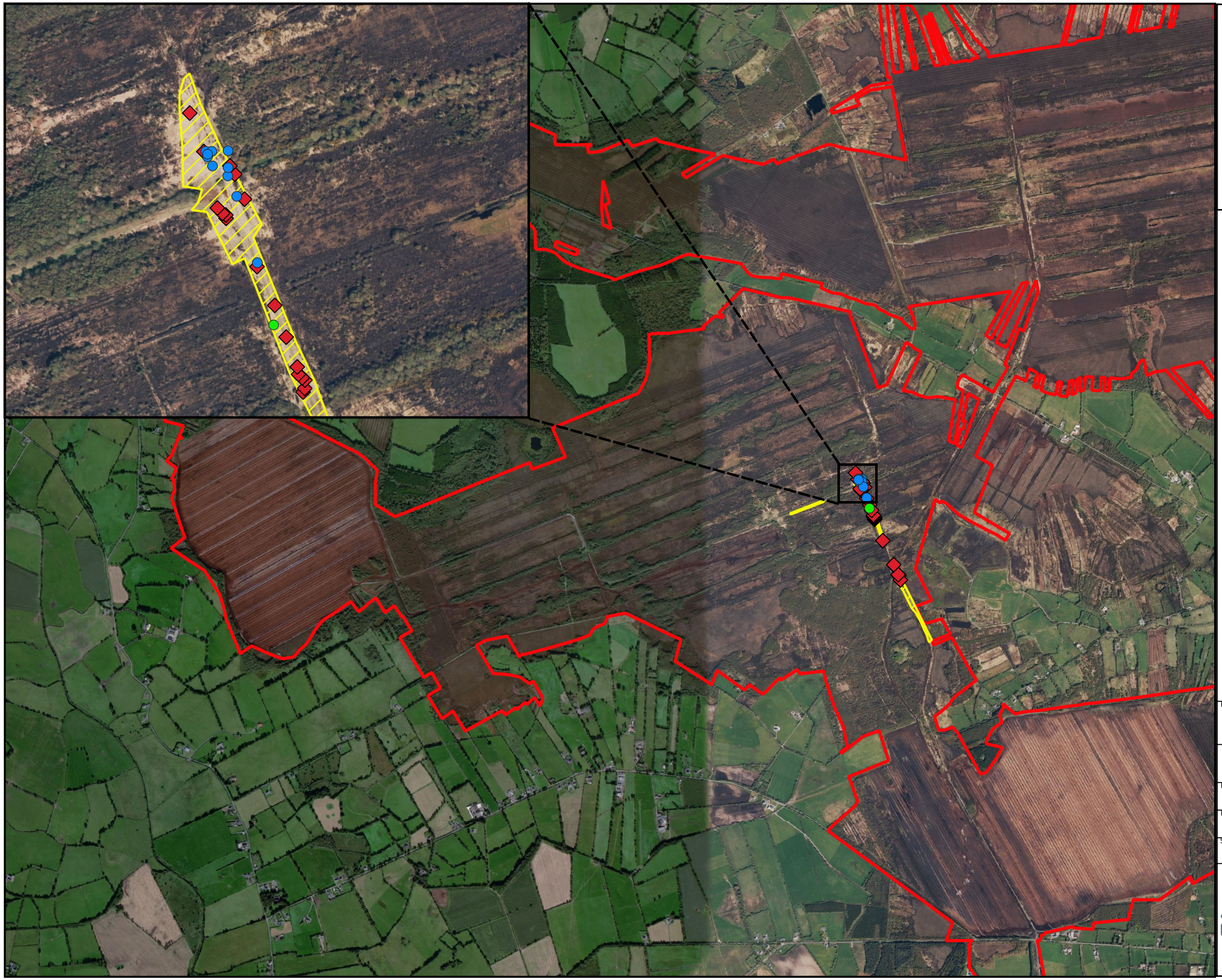
Drainage ditches within the Application Site itself generally had a poor structure and silty substrate and did not provide suitable spawning habitat for protected fish species, salmonids, European eel, lamprey or white-clawed crayfish.

6.3.2.3.7 Marsh Fritillary

The desk study identified that marsh fritillary is known to occur within the Application Site and the wider area. Adult marsh fritillary were identified during the Application Site walkover survey in May 2020.

Three larval webs were recorded during dedicated marsh fritillary larval web surveys undertaken in August 2023. These were recorded in the eastern section of Bracklin Bog, within areas previously identified as providing potential suitable habitat for this species (refer to Figure 6-7).

Additionally, during targeted surveys undertaken in April and June 2024, marsh fritillary caterpillars (later instar stages), adults, and eggs were recorded in the same area within the Application Site (Figure 6-7).


Map Legend
Application Site
Identified Suitable Habitat
Adult
Caterpillar
Eggs
Microsoft product screen shots reprinted with permission from Microsoft Corporation
Ordnance Survey Ireland Licence No. AR 0021821© Ordnance Survey Ireland/Government of Ireland
N
Drawing Title
Marsh Fritillary Survey Results
Project Title
Ballivor Substitute Consent Application
Drawn By
PD
Checked By
PR
Project No.
191137-f
Drawing No.
Figure 6-7
Scale
1:30,000
Date
08/07/2024
MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

6.3.2.3.8 Other species

During the walkover survey and/or deployment of camera traps, signs of the following mammal species were recorded:

- Fox (*Vulpes vulpes*) scat was recorded at various locations throughout the Application Site. As signs of fox were regularly recorded throughout the Application Site, the distribution of the species has not been mapped. The species was also caught on the camera trap deployed at the badger sett entrance at Bracklin Bog.
- Hare (*Lepus timidus hibernicus*) was frequently recorded throughout the Application Site along with its droppings and footprints. The species is widespread throughout the habitats present and no dedicated survey for the species was required.
- Mustelid scat that was likely to be that of pine marten (*Martes martes*) was recorded infrequently throughout the Application Site. No dens were recorded and no requirement for additional survey was identified.
- Deer prints were recorded regularly throughout the entire Application Site.
- Pygmy shrew (*Sorex minutus*) was recorded at Bracklin Bog within the Application Site.

In addition to the above mammal species (or signs thereof) that were recorded, it is likely that other species also occur on or around the Application Site but were not recorded during the site surveys that were undertaken. These include small mammal species such as wood mouse (*Apodemus sylvaticus*) but also larger mammals such as stoat (*Mustela ermina*) and mink (*Mustela vison*). No signs of any of these species were recorded during the walkover surveys and no requirement for dedicated surveys was identified.

No records of common lizard were recorded within the Application Site. However, the species is likely to occur in the area.

Incidental records of invertebrates were recorded during the walkover surveys of the Application Site. In addition to the aquatic invertebrates identified during kick samples of the watercourses on site, the following include the species commonly recorded within the Application Site:

- Common hawker dragonfly (*Aeshna juncea*)
- Four spotted chaser (*Libellula quadrimaculata*)
- Large red damselfly (*Pyrrhosoma nymphula*)
- Common carder bee (*Bombus pascuorum*)
- Buff-tailed bumblebee (*Bombus terrestris*)
- Red-tailed bumblebee (*Bombus lapidarius*)
- Heath bumble bee (*Bombus jonellus*)
- Small copper butterfly (*Lycaena phlaeas)*
- Common blue butterfly (Polyommatus icarus)
- Green hairstreak butterfly (*Callophrys rubi*)
- Peacock butterfly (*Inachis io*)
- Green tiger beetle (*Cicindela campestris*)
- Narrow-bordered bee hawkmoth (*Hemaris tityus*)
- Small heath butterfly (*Coenonympha pamphilus*)
- Meadow brown butterfly (*Maniola jurtina*)
- Speckled wood butterfly (*Pararge aegeria*)

6.3.3 Identification of Key Ecological Receptors (KERs)

The preceding sections, which have provided data on the ecology of Application Site through desk studies and field surveys, have helped inform the 1988 baseline of the site, as well as the ecology of the Application Site during each phase of the Project. Using the 1988 baseline and the additional

information data above, Table 6-20 identifies all receptors from all three phases of the Project (Peat extraction, Current, and Remedial) and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (TII, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors. These likely significant effects on ecological receptors identified as KERs is considered in Section 6.5 of this report.

Table 6-19 Key Ecological Receptors identified during the assessment

Ecological feature or species	Reason for inclusion as a KER	KER
Designated sites	**Nationally Designated Sites** The following pNHAs are located downstream (in excess of 20km) of the Application Site via the River Boyne. These sites have been assessed as of **National** importance in line with TII (2009) guidelines as they are proposed as Natural Heritage Areas (NHAs). › Trim pNHA › Boyne Woods pNHA › Crewbane Marsh pNHA › Rossnaree Riverbank pNHA › Dowth Wetland pNHA › Boyne River Islands pNHA › Boyne Coast and Estuary pNHA Taking a precautionary approach, the above listed downstream pNHAs were identified in Table 6-4 above as occurring within the Zone of Influence and are included as a KER.	Yes
	European Designated Sites The following Special Area of Conservation (SAC) and Special Protection Area (SPA) are identified in the AA Screening as being within the Likely Zone of Impact and are assessed fully in the rNIS that accompanies this Substitute Consent application: › River Boyne and River Blackwater SAC › River Boyne and River Blackwater SPA These sites are assigned **International** importance and included as a KER as a potential pathway for indirect effects on these sites via water pollution and disturbance of relevant QI/SCI species was identified. Refer to the rAASR submitted as part of this substitute consent application for full details. These European Sites were not designated until 2003 and 2010, respectively, and therefore would not have been assessed as Internationally Important at the 1988 baseline.	Yes
Aquatic Habitats and related species	**Drainage Ditches** The Application Site is drained by numerous drainage ditches. These are small man-made channels that are often devoid of vegetation and regularly maintained or choked with vegetation and are slow flowing. These drains are assigned **Local Importance (Lower Value)**.	No

Ecological feature or species	Reason for inclusion as a KER	KER
	Rivers and Streams The Deel (Raharney) river is located approximately 800m to the west of the Application Site and the Stonyford River is located approximately 450m to the east of the site. Both rivers, along with the River Boyne downstream, are designated as part of the River Boyne and River Blackwater SAC and have been assigned **International Importance**, as they form part of this European Site. In addition, a number of natural or slightly modified watercourses are located either within or at the perimeter of the Application Site. These watercourses include: • Cartenstown Stream (EPA code: 07C60), Stonestown River (07S11), Ballinn Stream (07B47), Bolandstown River (07B45), Woodtown West Stream (07W06), Carranstown Little River (07C87), Killaconnigan Stream (07K34), Kilballivor Stream (07B35), Ballivor River (07B52) and two unnamed tributaries, Graffanstown Stream (07G10), Ballynaskeagh Stream (07B24), Mucklin Stream (07M13), Craddanstown Stream (07C550) and Clondalee More Stream (07C77). These smaller rivers and Streams have been assigned **Local importance (Higher Value)** in that whilst many are highly modified where they adjoin the Application Site, they are conduits to waterbodies with a high biodiversity value in the local area. They also provide a conduit to downstream SACs of international importance.	Yes
	Aquatic and Fisheries Species The aquatic species that are associated with the rivers and streams located within and surrounding the Application Site are assigned **Local Importance (Higher Value)** in that they have a high biodiversity value in the local context. There is potential for indirect effect on these receptors in the form of water pollution. These species include salmonid and coarse fish, lamprey species, white clawed crayfish (*Austropotamobius pallipes*), European eel (*Anguila anguila*), aquatic invertebrates and other aquatic species.	Yes
Uncut Raised Bog	Areas of remnant uncut raised bog that are located throughout the Application Site, including Lisclogher West and smaller, more fragmented remnants within the Application Site, are assigned **County Importance**. This is because the larger areas of this habitat, i.e. those >30ha in size which contain drains which could be blocked and which support typical bog vegetation, are considered to conform to the Annex I Habitat 'Degraded Raised Bog still Capable of Natural Regeneration (7120)'. Areas of remnant uncut raised bog are mostly present at the edges of the Application Site, however, areas of this habitat are also present within the inner extents of Bracklin Bog and Lisclogher East Bog.	Yes
Cutover bog and associated secondary habitats	**Bare peat habitats** The bare peat habitats are of low ecological importance in their current state and have been assigned **Local Importance (Lower Value).**	No

Ecological feature or species	Reason for inclusion as a KER	KER
	Bog Woodland, Oak-ash-hazel woodland and pioneering Scrub These habitats are assigned **Local Importance (Higher Value)**. This is on the basis that they consist of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive (see **Appendix 6-4**). **Note: The bog woodland does not correspond to the Annex I Habitat Bog Woodland 91D0.**	Yes
	Poor fen This habitat is assigned **Local Importance (Higher Value)**. This is on the basis that it consists of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive.	Yes
	Heath type Communities This habitat is assigned **Local Importance (Higher Value)**. This is on the basis that it consists of semi-natural (although artificial) habitats with a high biodiversity value in the local area but do not correspond to habitats that are listed on Annex I of the EU Habitats Directive.	Yes
	Open water No large oligotrophic lakes were recorded within the site. Whilst wetter areas of the Application Site contained areas of open water, these are not permanent waterbodies. Given the absence of significant areas of open water habitat within or in close proximity to the site this habitat is not included as a KER.	No
Grassland Habitats	**Dry meadows and grassy verges (GS2) and Dry calcareous and neutral grassland (GS1)** These habitats are common and widespread in the wider area. The habitats have been assessed as of **Local Importance (lower value)** as they are largely associated with artificial site access tracks and are of low biodiversity value. For this reason, they have not been identified for further assessment and are not a KER.	No
	Improved agricultural grassland (GS1), Wet grassland (GS4), Amenity grassland (GA1) These areas are predominantly associated with agricultural fields and amenity areas close to the BnM works area at the Application Site. Although they contain small areas of semi-natural habitat that are of some local importance for wildlife, they are common and widespread in the local and wider landscape. These habitats are not included as KERs.	No
Spoil and bare ground (ED2), Recolonising bare ground (ED3) & Buildings and artificial surfaces (BL3)	These habitats are common and widespread in the wider area. The habitats have been assessed as of **Local Importance (lower value)** as they are largely associated with artificial site access tracks and are of low biodiversity value. For this reason, they have not been identified for further assessment and are not a KER.	No

Ecological feature or species	Reason for inclusion as a KER	KER
Otter	In July 1988 the Application Site would likely have supported similar populations of otter as it does today. Otter is assigned **Local Importance (Higher Value)** as there is likely to be a regularly occurring population of local importance utilising the watercourses within and downstream of the Application Site. No evidence of a more ecologically important population was recorded during any surveys of the Application Site surveys undertaken. Peat extraction activities and all ancillary works at the Application Site are likely to have had indirect effects on otter as a result of deterioration in water quality (supporting habitat) or disturbance/displacement during peat extraction activities and all ancillary works. Therefore, otter is included as a KER.	Yes
Badger	Although a number of badger setts were recorded within the Application Site, the site in its unmodified state, as an active raised bog prior to peat extraction activities, is unlikely to have supported significant woodland and scrub habitat suitable for badger habitat. Whilst some limited potential badger habitat may have been present in 1988, there is unlikely to have been any significant loss of badger habitat as a result of peat extraction activities and all ancillary works since 1988 as the most suitable habitat would have occurred in areas of woodland at bog margins. It is likely that the dry bog woodland which has since regenerated on many areas of the cutover bog provides more suitable badger habitat than would have existed had peat extraction activities and all ancillary works not been undertaken prior to 1988. The implementation of the rehabilitation plan for Ballivor Bog Group is unlikely to have a significant effect on this species. While there will be rewetting in areas, other parts of the bog will remain dry and continue to develop as woodland and scrub. Badger is not included as a KER.	No
Marsh fritillary	There are records for marsh fritillary in Bracklin Bog and the Application Site contains suitable marsh fritillary habitat in areas, particularly within the grassy verges running parallel to the railway tracks. During the 2023 and 2024 targeted marsh fritillary surveys, larval webs, caterpillars, adults and eggs were recorded in the eastern section of Bracklin Bog. The species has been assessed as of **County** importance as it is listed under Annex II of the EU Habitats Directive. Peat extraction activities and all ancillary works are unlikely to have resulted in loss of marsh fritillary habitat within the Application Site. The Application Site in its unmodified state, i.e. active raised bog, prior to peat extraction activities, is unlikely to have supported significant habitat for this species. On the contrary, the construction of infrastructure associated with peat extraction activities and all ancillary works, particularly the creation of the raised railway lines and the removal of raised bog habitat, resulted in the creation of areas of cutover bog habitat and grassland. These habitats, where they support Devil's bit scabious (the larval food plant for marsh fritillary) provide suitable habitat for this species. The majority of the works which would have resulted in the creation of grassland and cutover bog habitat within the Application Site occurred prior to 1988. Therefore, significant impacts, neither positive nor negative, on this receptor are unlikely to have occurred during the Peat Extraction Phase and Current Phase. The implementation of the rehabilitation plan for Ballivor Bog Group during the Remedial Phase is unlikely to have a significant effect on this	No

Ecological feature or species	Reason for inclusion as a KER	KER
	species, neither positive nor negative. While there will be rewetting in sections of the Application Site, as part of the Remedial Phase, the majority of the identified marsh fritillary habitat was recorded on raised embankments along the existing railway infrastructure. Given that these grassland habitats are in an elevated position relative to the peat extraction and associated activities, neither rewetting nor drying out of these habitats is likely to occur. Therefore, this species is not included as a KER.	
Bats	Bat species have been assessed as of **Local Importance (Higher Value)** as they represent a resident or regularly occurring populations assessed to be important at the Local level and are listed in Annex IV of the EU Habitats Directive. Similarly to badger, significant suitable habitat for bat species is unlikely to have existed at the Application Site in its unmodified state. The linear landscape features currently present within the Application Site as secondary habitats of cutover bog, including woodland and scrub habitat, have come about as a result of natural revegetation of the cutover bog following cessation of peat extraction. These areas of woodland and scrub provide foraging and commuting habitat for bats species would have been largely absent in remnant uncut raised bog and large areas of bare peat that would have existed in the July 1988 baseline environment. As no significant roosting habitat for bats was recorded on the Application Site and as the rehabilitation plans for the Application Site are unlikely to result in significant impacts on bat species, bats are not included as a KER. Additionally, whilst the Application Site may have provided some sub-optimal foraging or commuting habitat for bats in the form of raised bog, the majority of this habitat was removed prior to the 1988 baseline.	No
Bird species	In July 1988 the Application Site would likely have supported populations of bird species similar to those present today and typical of cutover bog habitats. Based on the bird species assemblages from the Bird Atlases and recorded utilising the site during breeding and wintering bird surveys undertaken by MKO in 2019 and 2021, birds have been assigned **County Importance.** Peat extraction activities and all ancillary works are likely to have had a negative effect on bird species utilising the cutover habitats of the Application Site (including any areas of remnant raised bog that have subsequently been subject to peat extraction activities and all ancillary works) as a result of habitat loss, disturbance and direct mortality. Therefore, birds are included as a KER.	Yes
Reptiles and Amphibians	In July 1988 the Application Site would likely have supported populations of reptiles and amphibians similar to those present today and typical of cutover bog habitats. No evidence of populations of amphibians being significant at more than a local level was recorded. No likely significant effects on these species are anticipated as suitable habitat is present in the wider area. Based on the low number of amphibian records for the Application Site amphibians and reptiles have been assessed as of **Local Importance (lower value**).	No
Additional fauna (e.g. Irish hare, fox etc).	The recorded evidence suggests that the Application Site is not utilised by populations of higher than local significance and no potential for significantly effects have been identified at the population level. The site surveys did not identify any other protected faunal species populations with the potential to be significantly affected by peat extraction activities and all ancillary works at the population level. Other faunal species are not considered further in this rEIAR. Significant effects are not anticipated.	No

6.4 Ecological Impact Assessment

6.4.1 'Do-Nothing' Effect

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and

independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

6.4.2 Likely Significant Effects

6.4.2.1 Peat Extraction Phase: July 1988 – June 2020

The following sections describe the likely significant effects of peat extraction activities and all ancillary works at the Application Site on Key Ecological Receptors (KERS) during the Peat Extraction Phase which includes all works undertaken from July 1988 to the cessation of peat extraction in June 2020.

By 1988, peat extraction activities and all ancillary works was well established at Lisclogher, Bracklin and Ballivor Bogs and was underway in the western section of Carranstown. All bogs had been subject to drainage and railway infrastructure had also been laid on all bogs with the exception of Lisclogher West. Carranstown East and the northern section of Bracklin West would have been drained but vegetation removal or peat extraction had not yet commenced. Lisclogher West was drained for milled peat production by 1995, however the bog was never brought into production.

The main activities on the Application Site between July 1988 and June 2020 included peat extraction, drainage (Lisclogher West), vegetation removal from areas drained but not yet cleared of vegetation (Carranstown East and the northern section of Bracklin West), creation and removal of stockpiles, peat transportation and maintenance of drains, machinery and pumps.

6.4.2.1.1 *Effects on Habitats (Habitat Loss, Fragmentation, Degradation)*

The table below describes the likely significant effects of peat extraction activities and all ancillary works during the Peat Extraction Phase (July 1988 to June 2020) on the remnant uncut raised bog and associated cutaway bog habitats at the Application Site.

Table 6-20 Likely significant effects on raised bog habitat

Description of Effect	Since 1988, the main activities at the Application Site have included peat extraction, drainage and vegetation clearance/stripping. These activities have been largely confined to the area already affected by the original cutting and drainage which took place between 1948 and the1980s. The impact of such activities was primarily the impediment and retardation of natural vegetation succession of the cutover bog and bare peat habitats present within the Application Site through continued operation. The mosaic of habitats that currently exists on the Application Site predominantly includes the following habitats: › Bare peat › Poor fen › Bog woodland › Scrub › Dry heath › Areas of wet and dry grassland › Remnant uncut raised bog

	› Conifer plantation In addition to the retardation of natural vegetation succession across the cutaway bog, there would also have been loss of areas of highly degraded, drained but uncut raised bog at Carranstown East and the southern section of Bracklin West. These areas, which comprise approx. 218ha, had been drained by 1988 but vegetation removal did not commence until post 1988. The drainage of Lisclogher West by 1995 would also have resulted in the degradation of approximately 238ha of remnant undrained and uncut raised bog.
Assessment of Significance prior to control measures	Following the initial cutting and drainage that occurred at the Application Site primarily between 1948 and the 1980s, the ongoing peat extraction activities and all ancillary works since 1988 are unlikely to have resulted in Significant effects on the remaining bog habitats, which were highly modified from their natural state and in general of lower biodiversity value than the intact raised bog habitats that would have been on site prior to peat extraction activities. This has been assessed as a Long term Slight Negative Effect and no Significant Effects are expected to have occurred. With respect to Lisclogher West, the installation of further drainage of this area of remnant raised bog up until 1995 is likely to have resulted in a Significant Negative Effect on the habitat at that location.
Control Measures	No control measures were in place between July 1988 and June 2020 to mitigate against or compensate for the loss of raised bog and habitats of cutover raised bog.

6.4.2.1.2 *Effects on Water Quality and Aquatic Fauna*

This section assesses the potential for likely significant effects on water quality and aquatic receptors including aquatic habitats (i.e. watercourses) and species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates, molluscs and other aquatic species identified as occurring within or likely to occur downstream of the Application Site.

Table 6-21 Likely significant effects on Watercourses and Sensitive Aquatic Species

Description of Effect	The Application Site is drained by a number of small streams and rivers which in turn drain to the Deel (Raharney) to the west of the Application Site and the Stonyford River to the east. These rivers are designated as part of the River Boyne and River Blackwater SAC designation and have connectivity with the River Boyne further downstream. The effects on water quality are fully described in Chapter 8 'Hydrology & Hydrogeology' of this rEIAR and are described here in relation specifically to ecology. **Suspended Solids** Taking 1988 as the baseline, peat extraction activities and all ancillary works which were undertaken at different times and at different levels of intensity throughout the Application Site, from July 1988 until the cessation of peat extraction in 2020, are likely to have resulted in indirect effects on aquatic receptors within and downstream of the Application Site in the form of water pollution. During this time there would have been potential for indirect effects on aquatic receptors in the form of deterioration of water quality of the watercourses within and downstream of the Application Site (and therefore degradation of supporting habitat for aquatic fauna) due to the release of pollutants including suspended solids. This would have occurred primarily during the construction of drainage channels, removal of surface vegetation and during peat extraction itself. During the Peat Extraction Phase, there was also an

	ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion of peat sediment via the bog drainage network. In addition, the release of dissolved nutrients, principally ammonia, resulting from the rapid breakdown of organic matter within peat once exposed to air, could also have resulted in deterioration of water quality of watercourses within and downstream of the Application Site. Within the Application Site, the first silt ponds were constructed at the Application Site in 1983/1984. Improved sediment control measures were installed at the Application Site in the late 1990's and early 2000's. Since 2000, the Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 and has been subject to the conditions of that licence which include emission limit values for suspended solids and other nutrients. **Accidental Leakages and Spillage of Hydrocarbons** During the Peat Extraction Phase there would also have been potential for pollution of surface water bodies and groundwater due to the accidental spillage of hydrocarbons during refuelling of machinery and plant. Discharges from wastewater systems (septic tanks) at office buildings, and at productions centres and workshops could potentially also have caused surface and groundwater contamination. A review of available AERs (Annual Environmental Reports submitted to the EPA under the IPC licences included as Appendix 4-3 of this rEIAR) reports that no significant pollution events/spills to surface or groundwater have occurred since 2000 (refer to Chapter 8 Hydrology & Hydrogeology). **Note: Whilst this impact assessment is in the aquatic habitats section, it also assesses the impact of the activities on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The activities would have had no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.**
Assessment of Significance prior to control measures	In the absence of mitigation and regulation of activities under IPC licence, the indirect effect of water pollution on aquatic receptors during peat extraction activities and all ancillary works is likely to have been a Long-term Indirect Negative Effect. Although the majority of water quality impacts are likely to have occurred pre-1988, the magnitude of the impact from July 1988 onwards in the absence of any mitigation is likely to have been Significant given the scale of peat extraction activities and all ancillary works. Since regulation under IPC licence in 2000, quarterly monitoring only recorded 3 no. exceedances of the suspended solids threshold and 5 no. exceedances above the IPC Licence trigger limit for ammonia during the monitoring period (2000–2020). The results show water quality impacts have not been significant since this time. Peat extraction activities and all ancillary works between July 1988 and June 2020 in the absence of any mitigation or regulation under IPC licence is likely to have had a Long-Term Significant Negative Effect on water quality.
Control Measures	**Suspended Solids** <u>Pre-IPC Licence</u> Prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, the Applicant was implementing several control measures to protect surface water quality in downstream waterbodies. These measures

primarily relate to the concentrations of suspended sediments in discharge from the bogs and are summarised below:

- Internal drains cleaned on a regular basis in suitable weather. This was completed to remove sludge from the bottom of ditches, allowing them to retain full functionality. The sludge was disposed of by spreading it on the adjacent production fields where it was dried and harvested;
- Drain maintenance was carried out using draglines and excavators, ensuring that these drains were fit for purpose;
- Drain maintenance was carried out mainly prior to and post the harvesting season.
- Silt ponds were utilised to control the amount of sediment being discharged at outfalls. At this time, silt ponds were designed for an upper limit of 100mg/l suspended sediment;
- Silt ponds were upgraded in the 1990s to cater for the settling of sufficient amount of silt. This often included the construction of a second silt pond adjacent to the first, which was used as a backup and to facilitate desludging of the primary pond; and,
- Silt ponds were desludged twice per annum.

Post IPC Licence:

The Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The Application Site also has a Surface Water Environmental and Operation Control Procedures (Appendix 4-11 of this rEIAR) which defines how compliance with the Licence is achieved. The drainage system in place at the bogs comprising field drains, main drains, piped drains and silt ponds upstream of outfall locations, is designed to prevent the release of elevated concentrations of suspended sediments into nearby surface waterbodies. As part of the IPC Licence, there is a limit of 35mg/l for suspended solids. Quarterly monitoring only recorded 3 no. exceedances of this threshold during the monitoring period (2000–2020).

Existing control measures which were implemented under the IPC licence are also designed to limit runoff rates from the bog units. These include:

- Silt ponds providing attenuation limited runoff during periods of intense rainfall.
- Continuous mitigation included maintaining the schedule of cleaning the silt ponds at a minimum of twice per year.

Accidental Leaks and Spillages

Pre IPC Licence

Prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, the Applicant was implementing several control measures to reduce the risk of contamination by spills and leakages. These measures primarily relate to the storage of peat harvesting machinery, refuelling procedures and waste management. These measures are summarised below and outlined in full in Chapter 4 at Section 4.3.5:

- All machinery were stored at the Ballivor Works at the end of each workday;
- All machinery were regularly inspected, serviced and cleaned. Cleaning was completed at a wash bay which drained towards an interceptor tank and associated soak pit;
- Where possible all refuelling was completed at the Ballivor Works;
- In the event that on-site refuelling was required, it was done with a mobile fuelling unit;

- In the event of an emergency spill, the following procedures were in place:
  - The General Manager (GM) was immediately informed of the incident.
  - The spill was assessed by the GM to assess the potential for environmental and/or health consequences.
  - The spill would have been sourced, isolated and contained with polystyrene booms or dry peat.
  - Every effort would have been made to prevent the spill from entering the nearest drain or outfall.
  - Once the spill was contained, a suitable absorbent (typically dry peat) was used to soak the spillage.
  - Follow up measures were taken to prevent such a spillage recurring in the future.
  - In the event of a spillage the GM notified 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; and,
- All washing from the self-contained machine parts washer was collected within a sludge tank at the Ballivor Works.

Post IPC Licence:

The refuelling procedures and mitigation measures implemented by the Applicant were upgraded and enhanced in order to comply with IPC licence conditions with the Application Site being regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The bogs also have Surface Water Management Plan[4] which define how compliance with the Licence is achieved. No additional control measures, other than compliance with the control measures regulated by the EPA, are considered necessary in terms of protecting groundwater quality. The list below outlines control measures conditioned under the IPC licencing regime, as regulated by the EPA:

- Effective spill/leak management of mobile fuelling units was undertaken;
- Replacement (and remediation where necessary) of all underground fuel tanks was undertaken;
- There was no other emissions to water of environmental significance;
- All tank and drum storage areas were rendered impervious to the materials stored therein. In addition, tank and drum storage areas was bunded;
- Drainage from bunded areas was 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 was 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 was carried out in designated areas protected against spillage and leachate run-off;
- While awaiting disposal, all materials were collected and stored in designated areas protected against spillage and leachate run-off;
- Except for roof water, all surface water discharges from workshop areas were fitted with oil interceptors;

[4] *Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf*

	› An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water was carried out weekly; › Bord na Móna undertook a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines were tested at least every three years; and, › Bord na Móna maintained (in storage) an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

6.4.2.1.3 *Effects on Fauna*

Peat extraction activities and all ancillary works are likely to have resulted in some habitat loss and disturbance impacts for a number of faunal species including otter, aquatic fauna and bird species. The potential effects on these species are assessed in the tables below.

With the exception of the above species. it is unlikely that peat extraction activities and all ancillary works would have resulted in significant negative effects on any other protected faunal species. The habitats present at the Application Site at the time i.e. bare peat, cutover bog, raised bog remnants are unlikely to have provided significant supporting habitat for populations of mammal, reptile/amphibian species of greater than local importance. Dry bog woodland and scrub which has since regenerated on areas of cutover bog is likely to have resulted in creation of some suitable supporting for habitat for badger, and badger setts were recorded within these habitats within Application Site during site surveys in 2021 in these habitats.

The linear landscape features currently present within the Application Site as secondary habitats of cutover bog, including woodland and scrub habitat, have come about as a result of natural revegetation of the cutover bog following cessation of peat extraction. These areas of woodland and scrub provide foraging and commuting habitat for bats species would have been largely absent in an active raised bog.

Marsh fritillary is known to occur at the Application Site. This species is dependent on the presence of the larval food plant devil's bit scabious. Areas of suitable habitat for marsh fritillary within the Application Site currently occur in grassland habitats, including those running parallel to the railway tracks within the Application Site and areas of cutover bog with devil's bit scabious, habitats which have come about as a result of peat extraction activities and all ancillary works. Therefore, the peat extraction activities and all ancillary works at the Application Site is unlikely to have resulted in significant negative effects on marsh fritillary.

The peat extraction activities and all ancillary works that took place at the Application Site during the Peat Extraction Phase are unlikely to have resulted in significant negative effects on any other protected faunal species.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.4.2.1.2 above and is not repeated below.

Assessment of Potential Effects on Otter

Table 6-22 Assessment of likely significant effects on otter

Description of Effect	**Habitat Loss/Degradation** The potential for impacts on otter as a result of peat extraction activities and all ancillary works would mainly have been in the form of indirect impacts on otter habitat as a result of deterioration of water quality. This is assessed in Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'
	Disturbance There would also have been potential for disturbance of otter where they occurred within and adjacent to the Application Site during peat extraction activities and all ancillary works. Potential for effects on otter has been considered with regard to NPWS '*Threat Response Plan*'[5] (TRP) which identifies four significant threats facing otter in an Irish context: habitat destruction, water pollution, disturbance (recreational sources) and accidental death/persecution.
Assessment of Significance prior to control measures	**Habitat Loss/Degradation** The likely effects due to deterioration in water quality are assessed in Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'
	Disturbance Otter are predominantly crepuscular in nature and most peat extraction activities and all ancillary works would have been be confined to daytime hours, thus minimising potential disturbance related impacts to the species. Channin P (2003) provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to otters (Jefferies (1987), (Durbin 1993). (Green & Green 1997). Irish Wildlife Manual No 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey &Rochford, 2006). Indirect impacts on otter as a result of disturbance during peat extraction activities and all ancillary works is likely to have been a Slight, Long-Term, Negative Effect. Although a small number of streams and rivers drain the Application Site, the majority of these are located towards the peripheries of the Application Site and the vast majority of watercourses within the Application Site are artificial drainage channels with low suitability for otter. No Significant Effects on otter are likely to have occurred during the Peat Extraction Phase of the Project, as a result of disturbance.

[5] *NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.*

Control Measures	**Habitat Loss/Degradation** Mitigation to prevent indirect impacts on water quality is as per Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'
	Disturbance No control measures would have been required during the Peat Extraction Phase.

Assessment of Potential Effects on Bird Species

The peat extraction activities and all ancillary works are likely to have had an indirect effect on wetland bird species, including kingfisher, where they occurred within and downstream of the Application Site as a result of habitat degradation due to deterioration on water quality. The potential impacts on water quality, and therefore on supporting wetland habitat for bird species, is as described in Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'.

An assessment of the likely potential effects on bird species during the Peat Extraction Phase is provided in the table below.

Table 6-23 Assessment of likely significant effects on birds

Description of Effect	**Habitat Loss/Degradation** The main impact of peat extraction activities and all ancillary works during the Peat Extraction Phase was primarily the impediment and retardation of natural vegetation and habitat succession throughout the Application Site through continued operation. Where peat extraction had ceased for some time, e.g. parts of Bracklin and Lisclogher Bogs, the habitats present have recovered and revegetated at different rates throughout the Application Site. As the habitats on site recovered and revegetated to form the current mosaic of cutover habitats, including scrub and heath habitat, this would have created suitable habitat for a variety of other bird species including meadow pipit, snipe, skylark. With respect to Lisclogher West, the installation of further drainage of this area of remnant raised bog up until 1995 is likely to have been some loss of habitat for species typical of raised bog including red grouse, curlew etc.
	Disturbance/Displacement Any disturbance related effects on birds would have been predominantly restricted to species typical of the cutover bog habitats in the Application Site, e.g. skylark, meadow pipit. There are likely to have been some levels of disturbance to these species from activities including the ongoing use of peat harvesting machinery and construction of the railway tracks and works areas. Where vegetation removal had not yet occurred by 1988, i.e. parts of Carranstown and Bracklin West, there would likely have been some disturbance and direct mortality of nesting birds when vegetation was being removed during the Peat Extraction Phase.

Assessment of Significance prior to control measures	**Habitat Loss/Degradation** The peat extraction activities and all ancillary works at the Application Site during the Peat Extraction Phase was confined largely to the area already affected by the original cutting and drainage. The ongoing effects with regard to habitat loss for bird species was likely to have been a Slight, Negative Effect. There are unlikely to have been significant effects on birds as a result of habitat loss during this time given the highly modified nature (from their original state) of the majority of the habitats on site by 1988. No Significant Effects on birds are likely to have occurred during the Peat Extraction Phase of the Project, as a result of habitat loss/degradation.
	Disturbance/Displacement The peat extraction activities and all ancillary works at the Application Site during the Peat Extraction Phase was largely confined to the area already affected by the original cutting and drainage. The ongoing effects with regard to disturbance and/or mortality for bird species was likely to have been a Slight, Negative Effect. No Significant Effects on birds are likely to have occurred during the Peat Extraction Phase of the Project, as a result of disturbance.
Control Measures	No known control measures were in place during the Peat Extraction Phase to mitigate against or compensate for the loss of raised bog and habitats of cutover raised bog.

6.4.2.1.4 *Effects on Designated Sites*

The Application Site is not located within the boundaries of any Nationally or European designated sites. Therefore, there were no direct effects on any designated sites during the Peat Extraction Phase.

In relation to European sites, an Appropriate Assessment Screening Report and remedial Natura Impact Statement (rNIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment in compliance with Article 6(3) of the Habitats Directive.

As per EPA Guidance (2022), *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

> *'it cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the development, individually or in combination with other plans and projects, would be likely to have a significant effect on the following sites:*
>
> - *River Boyne and River Blackwater SAC*
> - *River Boyne and River Blackwater SPA*

As a result, an Appropriate Assessment is required, and a remedial Natura Impact Statement has been prepared in respect of the Development in order to assess whether the Development is likely to have and will adversely impact the integrity of these European Sites'.

During the Peat Extraction Phase, there would likely have been indirect effects on the aquatic QIs of these European Sites as a result of deterioration of water quality in the watercourses within and downstream of the Application Site which discharge to the Stoneyford River and Deel (Raharney). These rivers are designated under the River Boyne and River Blackwater SAC and SPA. Impacts could potentially have occurred during the construction of drainage channels, removal of surface vegetation and during peat extraction activities and all ancillary works. The likely significant effects on these European Sites are described in detail within the rNIS prepared for the application.

The Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 since 2000. In addition, the drainage system has been designed to limit runoff from the Application Site via low-gradient field drains, mains drains, and silt ponds. Control measures relating to the protection of water quality are outlined in Table 6-21 above. Given the control measures that have been in place since regulation of the Application Site under IPC licence, no potential for significant adverse effects on these European Sites was identified.

The following pNHAs were identified in Table 6-4 above as being within the likely Zone of Influence of the Project:

- Trim pNHA
- Boyne Woods pNHA
- Crewbane Marsh pNHA
- Rossnaree Riverbank pNHA
- Dowth Wetland pNHA
- Boyne River Islands pNHA

Prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, the Applicant were implementing several control measures to protect surface water quality in downstream waterbodies, as detailed in Table 6-21. With these control measures in place, it was unlikely that significant effects on any of the above National Sites occurred, as a result of the Peat Extraction Phase of the Project.

6.4.2.2 Current Phase June 2020 - Present

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction at the Application Site in June 2020 to the present day. From mid-2020 to mid-2021 the operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare, the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

In addition to these works, rehabilitation works at the Application Site under the Peatland Climate Action Scheme (PCAS) have been commenced in areas that are identified as suitable for the prescribed enhancement measures and are currently ongoing. These include enhanced measures which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of areas of the Application Site. These include:

- Deep Peat measures including field re-profiling, bunding and drain-blocking, resulting in bunded wetlands suitable for Sphagnum inoculation, on deeper peat;

- Intensive drain blocking around shallow peat areas / modelled depressions on little or no peat to create/promote the spread of wetland habitats
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls
- Regular drain blocking on dry cutaway along with the blocking of outfalls and management of water levels
- Intensive drain blocking in areas to develop wetlands in areas of shallow peat. Measures include the blocking of outfalls, management of water levels and transplanting reeds and other rhizomes
- Berms and field re-profiling (45m x 60m cell) in deep peat areas, along with blocking outfalls and managing overflows with a controlled weir outfall, includes drainage channels for excess water and Sphagnum inoculation
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Seeding of vegetation and inoculation of Sphagnum will be undertaken where required.

6.4.2.2.1 *Effects on Habitats (Habitat Loss, Fragmentation, Degradation)*

Table 6-24 describes the likely significant effects on Habitats during the Current Phase (June 2020 to Present).

Table 6-24 Likely significant effects on Habitats

Description of Effect	Since the cessation of peat extraction at the Application Site in June 2020, there has been no additional loss or drainage of any of the cutover or remnant raised bog habitats within the Application Site. Activities have been confined solely to removal of stockpiled peat from the Application Site as well as rehabilitation works under the PCAS. Access to these areas is via existing machinery tracks.
Assessment of Significance prior to control measures	There has been no additional loss, degradation or fragmentation of habitat as a result of removal of peat stockpiles. Machinery access to existing stockpiles on the Application Site is confined to areas already subject to peat extraction activities and all ancillary works. No additional drainage, vegetation removal, peat harvesting has been undertaken. No Significant Effects on habitats are likely to have occurred during the Current Phase of the Project, as a result of habitat loss/degradation, or fragmentation.
Control Measures	No control measures

6.4.2.2.2 *Effects on Water Quality and Aquatic Fauna*

Table 6-25 describes the likely significant effects on Water Quality and Aquatic Fauna during the Current Phase (June 2020 to Present).

Table 6-25 Likely Significant Effects on Water Quality

Description of Effect	Since the cessation of peat extraction at the Application Site in June 2020, there was less potential for release of suspended sediments and pollution of water quality including watercourses and groundwater. There was also less potential for accidental spillage of pollutants due to the reduced machinery operating on site. During the Current Phase the site drainage still operated under the same drainage systems as during the Peat Extraction Phase i.e. field drains, main

	drains, silt ponds and discharge outlets etc. Therefore, discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase Despite the cessation of peat extraction at the Application Site, there is still some very limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Ballivor Works 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 6.4.2.1.2 above but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase. **Note: Whilst this impact assessment is in the habitats section, it also assesses the impact of the Project on aquatic species including salmonids, lamprey, coarse fish, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The Project had no direct impact on the aquatic habitat of these species and therefore there was no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.**
Assessment of Significance prior to control measures	In the absence of control measures and regulation of activities at the Application Site under IPC licence, there is potential for the Current Phase of the Project to have had a Long-Term Moderate Negative Effect on water quality.
Control Measures	During the Current Phase the Application Site continued to operate under IPC licensing requirements with respect to surface water discharge quality and quantity. Control measures are as outlined in Table 6-22 above.

6.4.2.2.3 *Effects on Fauna*

Effects on fauna as a result of the Current Phase would have been limited to the potential for degradation of supporting aquatic habitat for aquatic species including otter, salmonids, lamprey, eel etc. where they occur within and/or downstream of the Application Site, as well as disturbance of faunal species including otter and bird species due to the operation of plant and machinery.

The likely significant effects on water quality and supporting habitat for aquatic species are as per Table 6-25 above and of a much lesser scale than during the Peat Extraction Phase due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase.

The likely significant effects on fauna, including birds and otter, due to disturbance and displacement are as per Tables 6-22 and 6-23 above, however, to a lesser extent due to the reduced volumes of plant, machinery and workers at the Application Site. Access to existing peat stockpiles in the Application Site is via existing machine passes and therefore no vegetation removal and therefore no significant loss of supporting habitat for faunal species would have occurred.

6.4.2.2.4 *Effects on Designated Sites*

Despite the cessation of peat extraction at the Application Site in June 2020 there is still some very limited activity at the site involving machinery and plant (removal of peat stockpiles), the maintenance of the existing drainage network and environmental monitoring. The Application Site is hydrologically linked with the River Boyne and River Blackwater SAC/SPA. The risks to the receiving waters (in terms of water quantity and water quality) are the same as those outlined in Section 6.4.2.1.2 but to a much lesser extent due to the lower intensity of works being completed at the Application Site. Less activity on-site has decreased the likelihood of pollution incidents or exceedances of discharge limits occurring. The risk is much reduced in comparison to the Peat Extraction Phase of the Project.

Where PCAS works are ongoing at the Application Site as part of the rehabilitation plan, as described in Section 6.4.2.2 above, these works operate within the constraints of the relevant IPC licence (EPA IPC Licence - Ref. P0501-01). There will be no deterioration of water quality and thus, no impacts on any National or European Sites.

6.4.2.3 Remedial Phase

Under Condition 10.2 of the IPC Licence (Ref. P0501-01), a Cutaway Bog Decommissioning and Rehabilitation plan must be prepared for the permanent rehabilitation of the boglands within the licenced area. The Applicant has produced a Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Ballivor Bog Group (the Application Site), and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under IPC licence. The Cutaway Bog Decommissioning and Rehabilitation Plans are included in Appendix 4-2 of this rEIAR and the details of the plans are summarised in Chapter 4. The Remedial Phase involves the implementation of the rehabilitation plans.

The overall aim of the Cutaway Bog Decommissioning and Rehabilitation plans is environmental stabilisation of the former peat production areas, putting the bogs comprising the site on a trajectory towards becoming naturally functioning peatland systems. It is anticipated that the combination of rehabilitation measures and natural colonisation will result in environmental stabilisation. Nevertheless, according to the Cutaway Bog Decommissioning and Rehabilitation plans it will still take, in most cases, some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, will also be a rehabilitation strategy and will be undertaken via drain blocking and cell bunding as described in Chapter 4 of the rEIAR. Prior to the finalisation of and submission of the Cutaway Bog Decommissioning and Rehabilitation plans to the EPA, a baseline ecology survey is carried out to determine the status of natural colonisation, the potential for targeted revegetation and/or rewetting and the future development at the site to ensure stabilisation of the future cutaway.

The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation.

According to the Cutaway Bog Decommissioning and Rehabilitation Plans for Ballivor Bog Group (the Application Site), it is not expected, with the exception of Lisclogher West, that the majority of the Application Site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a small proportion of the bog has potential to develop Sphagnum-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, will improve overall habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

Rehabilitating former cutover/cutaway bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

6.4.2.3.1 Effects on Habitats (Habitat Loss, Fragmentation, Degradation)

Table 6-26 describes the likely significant effects on Habitats during the Remedial Phase.

Table 6-26 Likely significant effects on habitats during the Remedial Phase

Description of Effect	The implementation of the Rehabilitation Plans for Ballivor Bog Group will involve a combination of rehabilitation measures and natural colonisation (as well as continued vegetational succession) of cutaway/cutover habitats within the Application Site. Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat. Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established. Wetland measures including blocking outfalls and managing water levels with overflow pipes will also be undertaken. Given the nature of the rehabilitation works, i.e. drain blocking and natural recolonisation, there is no potential for significant loss of any peatland habitat as a result of the works and/or machinery required onsite during the implementation of the proposed rehabilitation plans. There is potential for the proposed rehabilitation plans to have a positive effect on the habitats present at the Application Site. Natural vegetation succession within the existing cutover habitats and areas of bare peat will result in an increase in habitat diversity within the Application Site. Whilst it is not anticipated that the majority of the Application Site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years), rewetting will nonetheless result in an overall improvement in the condition of the peatland habitats within the Application Site.
Assessment of Significance prior to mitigation	According to the rehabilitation plans, with the exception of parts of Lisclogher West, it is not anticipated that the Application Site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat in the foreseeable future (c. 50 years). Nevertheless, re-wetting, where this will be implemented, has potential to improve habitat conditions of the bogs, however it will take some time for stable naturally functioning ecosystems to develop. In addition, the continuation of natural vegetation succession will result in the revegetation of bare peat areas and therefore an increase in the habitat diversity within the site. The implementation of the proposed rehabilitation plans has the potential to result in a Permanent Significant Positive Effect on the habitats that exist on the Application Site at present.

	The proposed implementation of the rehabilitation plan has the potential to result in an increase in biodiversity and habitat diversity and well as an improvement to the condition of the peatland habitats on site through re-wetting. Significant Positive Effects on habitats within the Application Site are anticipated as a result of the Remedial Phase of the Project.
Mitigation	Whilst no loss or degradation of habitat is anticipated as a result of the works/machinery required on the Application Site to implement the proposed rehabilitation plans, the following best practice measures will be implemented. › Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area as outlined in the rehabilitation plans. › Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.

6.4.2.3.2 *Effects on Water Quality and Aquatic Fauna*

Table 6-27 describes the likely significant effects on Water Quality and Aquatic Fauna during the Remedial Phase.

Table 6-27 Likely significant effects on water quality

Description of Effect	The implementation of the rehabilitation plans for Ballivor Bog Group (the Application Site) aims to stabilise the former peat extraction areas via drain blocking, reprofiling of peat fields, fertilizer application and seeding of vegetation. Natural colonisation and targeted re-wetting will encourage revegetation of the former bare peat areas which in turn will stabilise substrates reducing the potential for elevation concentrations of suspended solids in runoff from the Application Site. This will also have benefits for aquatic fauna in terms of improved water quality and therefore habitat quality. Silt ponds will continue to operate during the early stages of the rehabilitation process and will only be decommissioned when the Application Site is deemed to be on a trajectory of environmental stability and/or rehabilitation has been completed. The water quality improvements associated with rehabilitated peatlands are not limited to reduced suspended solid concentrations. International studies have shown a long-term reduction in pollutant concentrations, including nitrate and ammonia, following rewetting in comparison to drained peatlands (Pschenyckyj. C. et al. 2021). While several studies have shown that the magnitude of these positive effects depends on site-specific factors such as the degree of degradation and local peat characteristics, all studies have shown an overall long-term decrease in pollutant concentrations (Negassa *et al.*, 2020). During the implementation of the rehabilitation plans, there will be some small-scale activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the buildings at Ballivor Works 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 Table 6-26 above and of a much-reduced nature to those during the Peat Extraction Phase due to the lower volumes of plant, machinery and workers operating at the Application Site during the Remedial Phase.

Assessment of Significance prior to mitigation	In the absence of mitigation there is potential for the operations at the Application Site during the implementation of the proposed rehabilitation plans to have a Long-Term Moderate Negative Effect on water quality. Following the implementation of the proposed rehabilitation plan, the bogs will be wetter, they will retain more water, they will recolonise with vegetation slowly, and they will eventually become naturally functioning peatlands with much-reduced silt and nutrient output. The outcome of the implementation of the proposed rehabilitation plans has potential to have a Long-Term Moderate Positive Effect. Given the reduced and small-scale nature of the operations anticipated at the Application Site during the works required for the implementation of the rehabilitation plans no Significant Negative Effects on water quality are likely to occur in the absence of mitigation.
Mitigation	As outlined in Chapter 8 Hydrology & Hydrogeology, the existing drainage systems and silt control measures will continue to operate during the early stages of the rehabilitation plans when there is the potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements. As outlined in Chapter 8, following implementation of the rehabilitation measures a programme of aftercare and maintenance, designed in accorded to meet the Conditions of the IPC Licence, will be completed at the Application Site. This will comprise of initial quarterly monitoring, with the number of site visits reducing after 2 years to bi-annually and then after 5 years to annual visits. A water quality monitoring program will be established to monitor the impact of rehabilitation on water quality discharge from the Application Site. The monitoring results will be reported on each year to the EPA with the parameters to be included as follows: monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC. In addition: › During periods of heavy precipitation and run-off, activities will be halted. › All machines will be regularly checked and maintained prior to arrival at the Application Site to prevent hydrocarbon leakage. › Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas. › Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling. › Vehicles will never be left unattended during refuelling. › No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out onsite. › All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations. › Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters. › Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site. › Fertiliser will not be applied on land which is waterlogged, flooded, likely to flood, frozen or covered with snow; › No fertiliser will be applied when heavy rain is forecast within the succeeding 48 hours;

	› No fertiliser will be applied on steeply sloping ground or where there is a rick of water pollution (i.e. the presence of drains); and, › No fertiliser will be spread on land within 2m of a surface watercourse.

6.4.2.3.3 *Effects on Fauna*

Natural recolonisation of the bogs will form the basis for the proposed rehabilitation plans. The habitats which have developed on the cutaway bogs to date following cessation of peat extraction include heath, scrub and woodland habitats and it is likely these habitats will also establish with time on drier areas of the cutover bog where natural vegetation colonisation is allowed to proceed. These habitats provide cover and nesting habitat for a range of bird species. They also provide areas of linear habitat with connectivity to the wider landscape and therefore provide suitable foraging and commuting habitat for bat species and other small mammals. Woodland and scrub also provide areas of potential badger habitat within the Application Site.

Potential for impacts in species identified as KERs in Table 6-19 above are discussed below.

Assessment of Potential Effects on Otter

Table 6-28 describes the potential significant effects on Otter during the Remedial Phase.

Table 6-28 Assessment of potential significant effects on otter during the remedial phase

Description of Effect	**Habitat** Implementation of the rehabilitation plans for Ballivor Bog Group (the Application Site) aims to stabilise the former peat extraction areas. Natural colonisation and targeted re-wetting will encourage revegetation of the former bare peat areas which in turn will stabilise substrates reducing the potential for elevation concentrations of suspended solids in runoff from the Application Site. This will also have benefits for aquatic fauna, including otter, in terms of improved water quality and therefore habitat quality. This is fully assessed in Table 6-27 Water Quality above. The implementation of the rehabilitation plans will involve targeted drain blocking and rewetting in the Application Site. Although otter may utilise drains within the Application Site for foraging and commuting, these habitats provide sub-optimal habitat for this species, with the stream around the peripheries of the Application Site providing more suitable otter habitat than artificial drains. The blocking of drains within the Application Site is unlikely to have a significant impact on otter in terms of habitat loss.
	Disturbance Drain blocking and re-wetting, which will form an element of the proposed rehabilitation plans, will involve the presence of small-scale machinery and personnel on site which creates potential for disturbance of otter utilising the Application Site. However, volumes of machinery on site will be much reduced compared to volumes that would have operated on site during the Peat Extraction Phase. While there will be some potential for disturbance of otter during the Remedial Phase, this will be of a much-reduced nature when compared to the Peat Extraction Phase.
Assessment of Significance prior to mitigation	**Habitat** The likely effects due to improvements in water quality are assessed in Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'

	Disturbance Otter are predominantly crepuscular in nature and most project activity would have been confined to daytime hours, thus minimizing potential disturbance related impacts to the species. Channin P (2003) provides a literary review with regard to anthropogenic disturbance and refers to several reports which have found that disturbance is not detrimental to otters (Jefferies (1987), (Durbin 1993). (Green & Green 1997). Irish Wildlife Manual No 76 (National Otter Survey of Ireland 2010/2012) notes that the occurrence of otter was unaffected by perceived levels of disturbance at the survey sites. It also notes that there is little published evidence demonstrating any consistent relationship between otter occurrence and human disturbance (Mason & Macdonald 1986, Delibes et al. 1991; Bailey &Rochford, 2006). The requirement for machinery and personnel on site during rehabilitation activities will be short term and the volumes of machinery and personnel will be much reduced in comparison to the Peat Extraction Phase. There is potential for a temporary Slight, Negative Effect on otter due to disturbance during the Remedial Phase. However, it is unlikely that the implementation of the rehabilitation plan will have any significant effect on otter. Although a small number of streams and rivers drain the Application Site, the majority of these are located towards the peripheries of the Application Site and the vast majority of watercourses within the Application Site are artificial drainage channels with low suitability for otter. No Significant Effects on otter are anticipated as a result of disturbance, during the Remedial Phase of the Project.
Mitigation	**Habitat Loss/Degradation** Mitigation to prevent indirect impacts on water quality is as per Table 6-21 above 'Potential for impact on Watercourses and Sensitive Aquatic Species'
	Disturbance › The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the Application Site and immediate environs. › All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996). › The Remedial Phase activities will be restricted to daylight hours and there will be no requirement for artificial lighting.

Assessment of Potential Effects on Birds

Table 6-29 describes the potential significant effects on Birds during the Remedial Phase.

Table 6-29 Assessment of potential significant effects on birds during the Remedial Phase

Description of Effect	**Habitat Creation** Natural recolonisation of the bogs will form the basis for the proposed rehabilitation plans. This is likely to create a diversity of habitats for bird species. The habitats which have developed on the Application Site during the Current Phase (and in some areas of the Application Site during the Peat Extraction Phase) following cessation of peat extraction include heath, scrub and woodland habitats and it is likely these habitats will also establish with time on drier areas of the cutover bog where natural vegetation colonisation is allowed to proceed. These habitats provide cover and nesting habitat for a range of bird species including meadow pipit, snipe and skylark. Targeted

	rewetting of areas also has potential to create areas of wetland habitat within the Application Site which will benefit wetland bird species and enhance habitat diversity within the Application Site.
	Disturbance Drain blocking and re-wetting, which will form an element of the proposed rehabilitation plans, will involve the presence of small-scale machinery and personnel on site which creates potential for disturbance of bird species utilising the Application Site. However, volumes of machinery on site will be much reduced compared to volumes that would have operated on site during the Peat Extraction Phase. While there will be some potential for disturbance of bird species during the Remedial Phase, this will be of a much-reduced nature when compared to the Peat Extraction Phase.
Assessment of Significance prior to mitigation	**Habitat** The implementation of the rehabilitation plan that is required to comply with Condition 10 of the IPC licence will result in a Permanent Significant Positive Effect on the habitats that exist on the Application Site at present, following cessation of the peat extraction activities at the Application Site. This is potential for a Permanent Significant Positive Effect on bird species through the creation of new habitat.
	Disturbance The requirement for machinery and personnel on the Application Site during rehabilitation activities will be short term and the volumes of machinery and personnel will be much reduced in comparison to the Peat Extraction Phase. There is potential for a Temporary Slight, Negative Effect on bird species using the Application Site due to disturbance during the Remedial Phase. The implementation of the Remedial Phase is unlikely to have any Significant Effect on bird species within the Application Site as a result of disturbance.
Mitigation	› The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the Application Site and immediate environs. › All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996). › The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.

6.4.2.3.4 *Effects on Designated Sites*

There are several National and European Sites downstream of the Application Site which, as per Section 6.4.2.1.4 above, there would likely have been indirect effects on the aquatic receptors of these Sites as a result of deterioration of water quality in the watercourses within and downstream of the Application Site which discharge to the Stoneyford River and Deel (Raharney).

The implementation of the rehabilitation plans for the Application Site aims to stabilise the former peat extraction areas. Natural colonisation and targeted re-wetting will encourage revegetation of the former bare peat areas which in turn will stabilise substrates reducing the potential for elevation concentrations of suspended solids in runoff from the Application Site.

Given the reduced and small-scale nature of the operations anticipated at the Application Site during the works required for the implementation of the rehabilitation plans no Significant Negative Effects on water quality, and thus, downstream Designated Sites, are likely to occur in the absence of mitigation.

6.5 Residual Effects

6.5.1 Peat Extraction Phase: July 1988 – June 2020

6.5.1.1 Habitats (Habitat Loss, Fragmentation and Degradation)

The ongoing peat extraction activities and all ancillary works from July 1988 to June 2020 are considered to have had a Slight Negative Residual Effect on the vast majority of the remaining bog habitats at the Application Site, which were highly modified from their natural state.

The ongoing effects of peat extraction activities and all ancillary works with regard to habitat loss, degradation and fragmentation were a Moderate, Negative Residual Effect on areas of remnant raised bog. The effect was considered moderate as, although the habitats were degraded and fragmented through drainage and peat extraction in the surrounding area, the original bog surface was in place.

With respect to Lisclogher West, the installation of further drainage of this area of remnant raised bog up until 1995 is likely to have resulted in a Significant Negative Residual Effect on the habitat at that location.

6.5.1.2 Water Quality and Aquatic Fauna

All activities that took place from July 1988 to 2000 were unlicensed and no records exist regarding the quality of discharges to nearby surface watercourses. However, by July 1988 peat extraction activities and all ancillary works were already well established at the Application Site and while EPA Q-values throughout the Peat Extraction Phase fluctuate, there is no clear negative trend in terms of surface water quality between July 1988 and June 2020. Some improved sediment control measures were installed at the site in the late 1990's and early 2000's and water quality discharge licence limits have been in place since 2000 in accordance with IPC licensing. The available monitoring data indicate that improvements in downstream water quality have not been significant, and this is because there are other activities in the catchment that effect water quality and also that the baseline water quality was reasonably good and has not changed significantly during the Peat Extraction Phase.

With the implementation of the control measures outlined above, it is considered that there has been a Long-Term Moderate Negative Effect on downstream surface water quality as a result of release of suspended solids during the Peat Extraction Phase.

From a review of the available Annual Environmental Report (AER) reports included as Appendix 4-3 of this rEIAR, no significant fuel spills or wastewater discharges have occurred since 2000. In addition, extensive control measures have been implemented since 2000 as part of the IPC licence which mitigates against the possibility of any surface or groundwater contamination. Prior to IPC regulation, there are no records, but there does not appear to be any records of significant issues with hydrocarbons or wastewater discharges to surface or groundwater resulting from the peat extraction activities and all ancillary works.

The residual effects on water quality as a result of accidental leakages and spillages is not considered to be significant.

6.5.1.3 Fauna

Otter

Regards habitat loss/degradation for otter, this is confined to indirect impact on supporting habitat as a result of the deterioration of water quality, which is assessed in Table 6-22. The residual impacts on water quality as a result of the Peat Extraction Phase are provided in Section 6.5.1.2 above.

With regards to indirect impacts as a result of disturbance to otter during the Peat Extraction Phase, no Significant Residual Effects are expected to have occurred.

Birds

It is unlikely that Significant Residual Effects on bird species occurred during the Peat Extraction Phase of the Project, as a result of habitat loss, disturbance, or direct mortality.

6.5.1.4 Designated Sites

Given the control measures that were in place prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, it was unlikely that significant effects on any of the above National or European Sites occurred, as a result of the Peat Extraction Phase of the Project.

6.5.2 Current Phase: June 2020 to present day

6.5.2.1 Habitats (Habitat Loss, Fragmentation or Degradation)

There has been no additional loss, degradation or fragmentation of habitat as a result of the Current Phase of the Project and therefore, there are no residual Significant Effects on any habitat are likely to have occurred during this period.

6.5.2.2 Water Quality and Aquatic Fauna

There has been no discernible trend (positive or negative) in Q-values in downstream surface watercourses since the cessation of peat extraction June in 2020 (refer to Chapter 8 Hydrology & Hydrogeology). Additionally, a review of the available AER reports included in Appendix 4-3, indicates that there has been no significant fuel spills or wastewater discharges. No Significant Residual Effects are likely to have occurred during this period.

6.5.2.3 Fauna

Effects on fauna as a result of the Current Phase would have been limited to the potential for degradation of supporting habitat for aquatic species including otter, salmonids, lamprey, eel etc. where they occur within and/or downstream of the Application Site, as well as disturbance of faunal species including otter and bird species due to the operation of plant and machinery.

As no Significant Effects on Fauna are likely to have to occurred during the Current Phase of the Project, no Significant Residual Effects are likely to have occurred during this period.

6.5.2.4 Designated Sites

Whilst some limited activity at the site involving machinery and plant (removal of peat stockpiles), the maintenance of the existing drainage network and environmental monitoring is still on going, these

works are much reduced in comparison to the Peat Extraction Phase of the Project, and therefore, no Significant Residual Effects are likely to have occurred during this period.

6.5.3 Remedial Phase

6.5.3.1 Habitats (Habitat Loss, Fragmentation or Degradation)

The implementation of the Cutaway Bog Decommissioning and Rehabilitation plans will have a Permanent Significant Positive Residual Effect on the habitats present within the Application Site.

6.5.3.2 Water Quality and Aquatic Fauna

Following the implementation of the Cutaway Bog Decommissioning and Rehabilitation plan, the bogs will be wetter, they will retain more water, they will recolonise with vegetation slowly, and they will eventually become naturally functioning peatlands with much-reduced silt and nutrient output. As such the residual effects of the implementation of the rehabilitation plans for the Remedial Phase is considered to be a Long-Term Moderate, Positive, Indirect Effect on downstream surface water hydrology and water quality and aquatic fauna.

6.5.3.3 Fauna

Otter

Effects on otter as a result of the Remedial Phase of the Project are limited to the potential for degradation of supporting habitat for aquatic species including otter, salmonids, lamprey, eel etc. where they occur within and/or downstream of the Application Site, which is assessed in Table 6-28 and Section 6.5.3.2. No residual Significant Effects are anticipated.

Birds

The residual effect on habitats for birds species following the implementation of the Cutaway Bog Decommissioning and Rehabilitation plans is a Long Term, Significant Positive Effect as the remaining habitats on the bog will be managed specifically to stabilise and revegetate. Targeted rewetting of areas also has potential to create areas of wetland habitat within the Application Site which will benefit wetland bird species and enhance habitat diversity within the Application Site.

There is potential for a Long-Term Significant Positive Residual Effect on bird species.

6.5.3.4 Designated Sites

With the implementation of the Remedial Phase of the Project, there is potential for Long-Term Slight Positive Effects on Designated Sites.

6.6 Significance of Effects

6.6.1 Peat Extraction Phase: July 1988 – June 2020

6.6.1.1 Habitats (Habitat Loss, Fragmentation and Degradation)

Based on the assessment in Section 6.4 above there no significant effect on the cutaway peatland habitats as a result of the Peat Extraction Phase of the Project.

With respect to Lisclogher West, it is considered that the Peat Extraction Phase had a Long-Term Permanent Significant Negative Effect on remnant raised bog.

No Significant Effects on any other habitats are likely to have occurred.

6.6.1.2 Water Quality and Aquatic Fauna

Based on the assessment in Section 6.4 above it is considered that the Peat Extraction Phase had a significant effect on water quality of downstream watercourses and the aquatic fauna they supporting

6.6.1.3 Fauna

Otter

Assessment of significant Effects on otter as a result of habitat loss/degradation during the Peat Extraction Phase of the Project was limited to indirect effects on water quality. This is assessed in Table 6-22 above and it is considered that the Peat Extraction Phase had a significant effect on water quality

No significant effects on otter as a result of disturbance is likely to have occurred during the Peat Extraction Phase of the Project.

Birds

No significant impacts on birds as a result of disturbance are likely to have occurred during the Peat Extraction Phase of the Project.

6.6.1.4 Designated Sites

Assessment of potential significant impacts on European Sites are presented in rNIS which accompanies this application for Substitute Consent. Based on the assessments above, no significant effects on National Sites are unlikely to have occurred during the Peat Extraction Phase of the Project.

6.6.2 Current Phase: June 2020 to present day

6.6.2.1 Habitats (Habitat Loss, Fragmentation and Degradation)

No significant effects on habitats have occurred due to removal of stockpiles of peat from the Application Site during the Current Phase of the Project.

6.6.2.2 Water Quality and Aquatic Fauna

No significant effects on water quality or aquatic fauna have occurred due to removal of stockpiles of peat from the Application Site during the Current Phase of the Project.

6.6.2.3 Fauna

The likely significant effects on water quality and supporting habitat for aquatic species are as per Table 6-26 above. No significant effects on fauna are likely have occurred as a result of the Current Phase of the Project.

6.6.2.4 Designated Sites

Assessment of potential significant impacts on European Sites are presented in rNIS which accompanies this application for Substitute Consent. Based on the assessments above, no significant effects on National Sites are likely have occurred as a result of the Current Phase of the Project.

6.6.3 Remedial Phase

6.6.3.1 Habitats (Habitat Loss, Fragmentation and Degradation)

There is potential for Significant Positive Effects on the habitats within the Application Site during the Remedial Phase of the Project.

6.6.3.2 Water Quality and Aquatic Fauna

There is potential for Significant Positive Effect on water quality within and downstream of the Application Site during the Remedial Phase of the Project.

6.6.3.3 Fauna

Otter

No significant effects on otter, or any other fauna, are anticipated as a result of disturbance, during the Remedial Phase of the Project. There is potential for Significant Positive Effect on supporting aquatic habitats within and downstream of the Application Site

Birds

There is potential for Significant Positive Effect on bird species through the creation of new habitat, as a result of the Remedial Phase of the Project. No significant effects on birds as a result of disturbance is anticipated.

6.6.3.4 Designated Sites

There is potential for Significant Positive Effects on water quality as a result of the Remedial Phase of the Project. Therefore, as there are multiple Designated Sites downstream of the Application Site, there is potential for Long-Term Slight Positive Effects on National and European Sites, via increased surface water quality as a result of the Remedial Phase of the Project.

6.7 Cumulative and In- Combination Effects

The peat extraction activities and all ancillary works at the Application Site were considered in combination with other plans and projects in the area that could result in cumulative impacts on the Key Ecological Receptors (KERs) identified in Section 6.3.3 of this report, including European Sites and Nationally designated sites. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Appendix 2-1 of the rEIAR.

Additionally, this assessment considers historical cumulative impacts with regard to peat extraction activities and all ancillary works within the Application Site prior to 1988. It assesses the cumulative impacts on biodiversity within the Application Site from the commencement of Bord na Móna peat extraction activities and associated works in 1948, up to July 1988 together with the Peat Extraction Phase of the Project (i.e July 1988 to June 2020).

6.7.1 Assessment of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Westmeath County Development Plan 2021 – 2027
- Westmeath County Development Plan 2014 – 2020
- Westmeath County Development Plan 2008 – 2014
- Westmeath County Development Plan 2002 – 2008
- Meath County Development Plan 2021-2027
- Meath County Development Plan 2021-2027
- Meath County Development Plan 2013-2019
- National Biodiversity Action Plan 2007-2013

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of peatlands and sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6-30 Assessment of Plans.

Table 6-30 Assessment of Plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
Westmeath County Development Plan 2021-2027	The overall objective of the Development Plan has been identified: *Continue to protect and enhance the County's natural heritage and biodiversity and ensure that networks of green infrastructure are identified, created, protected and enhanced to provide a wide range of environmental, social and economic benefits to communities.* **Policies: Natural Heritage** It is the policy of the Council to: **CPO 12.1** • Contribute as appropriate towards the protection of designated sites in compliance with relevant EU Directives and applicable national legislation **CPO 12.2** • Support the implementation of any relevant recommendations contained in the National Biodiversity Plan, the All-Ireland Pollinator Plan and the National Peatlands Strategy. **Policies: Natura 2000** It is a policy of the Council to: **CPO 12.4** • Protect and conserve Special Areas of Conservation, candidate Special Areas of Conservation, Special Protection Areas and candidate Special Protection Areas, designated under the EU Birds and Habitats Directives respectively.	The Development Plans were comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity and Designated Sites. The peat extraction activities and all ancillary works, which were undertaken at different times and at different levels of intensity throughout the bog between 1988 and 2020, are unlikely to have resulted in a significant effect on biodiversity (with the exception of Lisclogher West) and designated sites and are therefore not considered to be in contravention of the policies and objectives within the development plans. The implementation of the Cutaway Bog Decommissioning and Rehabilitation plan for the Application Site will have a significant positive effect on biodiversity, including the uncut but drained peatland habitat at Lisclogher West. There is also potential for positive effects on Designated Sites which are hydrologically connected to the Application Site via improvements in water quality which is in compliance with the policies and objectives outlined within the plan.

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	CPO 12.5 • Ensure that no plans, programmes, etc. or projects giving rise to significant cumulative, direct, indirect or secondary impacts on European Sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this Plan (either individually or in combination with other plans, programmes, etc. or projects).* **CPO 12.6** • Ensure that any plan or project that could have a significant adverse impact (either by themselves or in combination with other plans and projects) upon the conservation objectives of any Natura 2000 Site or would result in the deterioration of any habitat or any species reliant on that habitat will not be permitted.* ** Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.* **Policies: Rare and Protected Sites** It is a policy of the Council to: **CPO 12.13** • Protect, manage, and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath, in recognition of its importance as both a non-renewable resource and a natural asset. **CPO 12.18**	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	• Consult with the National Parks and Wildlife Service (NPWS) in regard to any developments (those requiring permission and those not requiring planning permission) which the Council proposes to carry out within pNHAs, NHAs, SACs, SPAs, and other important ecological sites. **Policies: Invasive species** It is a policy of the Council to: **CPO 12.27** • Prevent the spread of invasive species within the plan area, including requiring landowners and developers to adhere to best practice guidance in relation to the control of invasive species **CPO 12.29** • Support, as appropriate, the National Parks and Wildlife Service's efforts to seek to control and manage the spread of non-native invasive species on land and water. Where the presence of non-native invasive species is identified at the site of any proposed development or where the proposed activity has an elevated risk of resulting in the presence of these species, details of how these species will be managed and controlled will be required.	
Meath County Development Plan 2021-2027	**Policies and Objectives: Biodiversity** **HER POL 27** • To protect, conserve and enhance the County's biodiversity where appropriate **HER POL 28** • To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate. **HER POL 29** • To raise public awareness and understanding of the County's natural heritage and biodiversity **HER POL 30** • To promote increased public participation in biodiversity conservation by supporting and encouraging community-led initiatives. **HER POL 31** • To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate). **HER OBJ 30** • To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of Ireland's National Biodiversity Action Plan 2017 - 2021 which relate to the remit and functions of Meath County Council. **HER OBJ 31** • To implement, in partnership with the Department of Culture, Heritage and the Gaeltacht, relevant stakeholders and the community, the objectives and actions of the County Meath Biodiversity Plan 2015-2020 and any revisions thereof. **HER OBJ 32** • To actively support the implementation of the All Ireland Pollinator Plan 2021-2025 and any revisions thereof. **Policies and Objectives : Sites Designated for Nature Conservation**	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	HER POL 32 • To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife. **HER POL 33** • To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation. **HER POL 34** • To undertake appropriate surveys and collect data to provide an evidence-base to assist the Council in meeting its obligations under Article 6 of the Habitats Directives (92/43/EEC) as transposed into Irish Law, subject to available resources. It is an objective of the Council: **HER OBJ 33** • To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC) and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is Meath County Development Plan 2021-2027 Chapter 8 carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives. **HER OBJ 34** • To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Culture, Heritage and the Gaeltacht and any	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	other sites that may be proposed for designation during the lifetime of this Plan in accordance with the provisions of the Habitats and Birds Directives and to permit development in or affecting same only in accordance with the provisions of those Directives as transposed into Irish Law. **Policies and Objectives: Non-Designated Sites** **HER POL 35** • To ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites and to require an appropriate level of ecological assessment by suitably qualified professional(s) to accompany development proposals likely to impact on such areas or species. **Policies and Objectives: Protected Species** **HER POL 36** • To consult with the National Parks and Wildlife Service and take account of their views and any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law. **HER OBJ 35** • To ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law. **Policies and Objectives: Peatlands** **HER POL 45** • To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance. **HER OBJ 39** • To work in partnership with relevant stakeholders on a suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	Assessment and Appropriate Assessment Screening, as appropriate, having regard to local and residential amenities.	
Westmeath County Development Plan 2014-2020	**Policies** **P-PTL1**: To protect the county's designated peatland areas and landscapes, including any historical walkways through bogs and to conserve their ecological, archaeological, cultural, and educational heritage. **P-PTL4:** To plan and prepare for the future sustainable and environmentally sensitive use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs, including habitat creation, in conjunction with adjacent Local Authorities. This plan will have regard to both National and Regional frameworks with regard to the future use of peatlands, including cutaway bogs. **P-PTL5:** To exercise control of peat extraction, both individually and cumulatively, which would have significant impacts on the environment. **Objectives** **O-PTL3:** To work with other bodies such as the NPWS and Coillte to support the conservation of peatlands. **O-PTL5:** To work in partnership with relevant stakeholders on suitable peatland site(s) to demonstrate best practice in sustainable peatland conservation, management and restoration techniques and to promote their heritage and educational value subject to Ecological Impact Assessment and Appropriate Assessment, as appropriate. **O-PTL6:** To support the preparation of a Sustainable Holistic Management Plan for the future use of the Industrial Peatlands in the county, which recognises the role of peatlands in carbon sequestration.	
Westmeath County Development Plan 2008 - 2014	**Policies & Objectives** **Natural heritage** **O-EH2**: To protect, manage and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath in recognition of its importance as a non-renewable resource, unique identifier and character of the county and as a natural resource asset.	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	O-EH3: It is a key objective to ensure as far as possible that development does not impact adversely on wildlife habitats and species. In the interests of sustainability, b **P-EH19:** It is the policy of Westmeath County Council to ensure the conservation of the county's peatlands in order to minimise the negative impact on natural diversity and the archaeological and cultural heritage of the county. **O-EH14:** To conserve peatlands and protect peatland landscapes within the county. O-**EH15:** To continue to identify and map peatland sites of high local ecological value and protect them for their biodiversity. **O-EH16**: To exercise control of peat extraction both individually and cumulatively which would have significant impacts on the environment as provided for under SI 364 of 2005. **O-EH18**: To seek hydrological reports for significant developments within and in close proximity to peatlands so as to assess impacts on integrity of peatland ecosystems. **O-EH19**: To plan and prepare for the future use of large industrial bog sites when peat harvesting finishes and to encourage a balanced approach to the redevelopment of cutaway bogs. There is potential for habitat creation such as woodlands, grasslands, and wetlands. There is also potential for amenity value with development of parklands and economic uses such as agricultural grasslands, forestry and wind energy. **O-EH20** To work with other bodies such as NPWS and Coillte to support the conservation of Peatlands. **Future of Cutaway Peatland** **P-EH32** Within the next 20–30 years large areas of peatland will be exhausted and provide tracts of land that have potential for agriculture, habitat and amenity. The Council, in consultation with relevant agencies, will explore future potential of cut away peatlands that may offer opportunities for habitat creation or amenity and recreation areas such as community woodlands or parklands.	
Meath County Development 2013-2019	It was an objective of this Plan for Meath County Council to "*investigate the potential of renewable energy identified in the initial assessment areas with a view to developing a renewable energy strategy for the County.*"	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
Meath County Development 2007 - 2013	**Policies** **HER POL 18:** To ensure that peatland areas which are designated (or proposed for designation) as NHAs or SACs are conserved and managed appropriately to conserve their ecological, archaeological, cultural and educational significance.	
National Biodiversity Action Plan 2017-2021	Target 6.2 - Sufficiency, coherence, connectivity and resilience of the protected areas network substantially enhanced by 2020.	The Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to biodiversity and Designated Sites. The peat extraction activities and all ancillary works had the potential to result in significant negative effects on biodiversity which would have been in contravention of the policies and objectives within the plan. The ongoing operations since the peat extraction activities and all ancillary works during the Peat Extraction Phase, which were undertaken at different times and at different levels of intensity throughout the bog, are unlikely to have resulted in a significant effect on biodiversity and are therefore not considered to be in contravention of the policies and objectives within the plan. The implementation of the Cutaway Bog Decommissioning and Rehabilitation plan for the site will have a significant positive effect on biodiversity and is in compliance with the policies and objectives outlined within the plan.

6.7.2 Projects

As described in Chapter 2, Section 2.4 of the EIAR, the available planning history of the surrounding environs of the Application Site dates to 1985. The majority of planning applications granted permission by the Planning Authorities during the Peat Extraction Phase (July 1988 to June 2020) relate to one-off rural dwelling houses, residential development (i.e. modification and/or re-development of existing dwellings) and agricultural development, including new entrances, sheds and ancillary plant and infrastructure. Relevant projects granted during this period are listed in Appendix 2-2 of the EIAR.

With regard to planning applications lodged during the Current Phase (June 2020 to present day) (listed below), peat extraction within the Application Site was already permanently ceased and removal of peat stockpiles and licence compliance activities were ongoing without any discernible effects on the environment.

- Meath Pl Ref. **96/418**: A two storey dwelling house, septic tank and percolation area (Final Grant – 12th November 1996)
- Westmeath Pl Ref. **98/250**: Erect dormer bungalow and septic tank (Final Grant – 23rd December 1998)
- Westmeath Pl Ref. **00/900**: Construction of house and septic tank (Final Grant – 14th December 2000)
- Westmeath Pl Ref. **01/792**: Dormer bungalow, septic tank and percolation areas [outline] (Final Grant – 19th July 2002)
- Westmeath Pl Ref. **04/2084**: New dwelling house, 'septech 2000' treatment system, percolation area and domestic garage (Final Grant – 15th September 2004)
- Westmeath Pl Ref. **04/2126**: Construct a bungalow with a proprietary wastewater treatment system (Final Grant – 15th October 2004)
- Westmeath Pl Ref. **06/2025**: Construct a new bungalow, domestic garage, septic tank and percolation area (Final Grant – 19th May 2006)
- Westmeath Pl Ref. **06/2236**: Erect a new dwelling house, septic tank, treatment system, percolation area and ancillary site works (Final Grant – 13th October 2006)
- Westmeath Pl Ref. **08/2101**: Demolish existing dwelling house and planning permission to erect a new replacement dwelling house, septic tank, treatment system and ancillary site works (Final Grant – 2nd February 2009)
- Westmeath Pl Ref. **15/6142**: Single storey dwelling, septic tank, sewage treatment system, percolation area, domestic garage, new entrance and all ancillary site works (Final Grant – 13th January 2016)
- Westmeath Pl Ref. **15/6135**: To erect a guyed wind monitoring mast, with instruments,up to 100m in height, at Lisclogher Bog, Lisclogher Great, Co Westmeath. The purpose of the proposed mast is to assess the suitability of the company's adjacent lands for wind farm development (Final Grant – 15th October 2015)
- Westmeath Pl Ref. **15/6143**: To Renovate and extend existing semi-detached dwelling. One and a half storey extension to the side & rear of existing dwelling, construction of a domestic garage/store, horse stable and tack room, relocate existing entrance & install proprietary waste water treatment system & percolation area (Final Grant - 15th October 2015)
- Meath Pl Ref. **TA150349**: development will consist of a storey and a half type dwelling, domestic garage, proprietary wastewater treatment system with associated polishing filter and open new entrance to site (Granted - July 2, 2015)
- Meath Pl Ref. **TA150738**: retention permission for essential structural repairs to date including roof & porch replacements and foundations to future extension, planning permission to complete general building upgrade with minor elevational changes and planning permission for a 2 storey extension to south west side, domestic waste treatment unit & new percolation area and removal of existing septic tank,

replacement road access vehicular gate and rebuild piers & flanking walls, replacement road access pedestrian gate, extended & repaired/rebuilt stepped road frontage walls, walls & hedges to new site's other boundaries and reusing existing sheds as domestic garage and storage facilities (Granted - October 7, 2015)

- Meath Pl Ref. **TA151297**: to retain existing dog kennels, enclosures & associated structures. The Rescue Centre contains (a) 4 no. timber kennels, (b) 2 no. concrete structure kennels, (c) 2 no. prefabricated structure incorporation office, store & grooming room. Significant further information/revised plans submitted on this application (Granted - March 8, 2017)
- Westmeath Pl Ref. **17/6274**: Retention of existing dwelling house and ancillary site works (Final Grant – 10th July 2018)
- Meath Pl Ref. **TA170047**: a single storey dwelling, a detached domestic garage, a proprietary domestic effluent treatment system, shared site entrance previously granted under Ref. TA/130317 and all associated site works. Significant further information/revised plans submitted on this application (Granted - September 1, 2017)
- Meath Pl Ref. **TA180421**: a single storey dwelling, a detached domestic garage, wastewater disposal system, site entrance and all associated site works (Granted - August 9, 2018)
- Meath Pl Ref. **TA180485**: extension of duration of planning permission ta130317 - single storey dwelling, detached domestic garage, proprietary domestic effluent treatment system, site entrance and all associated site works (Granted - July 5, 2018)
- Meath Pl Ref. **TA201217**: change of house type from a single storey type dwelling to a storey and a half type dwelling and revisions to the site layout plan as previously granted under planning ref TA170047 and all associated site works (Granted - December 8, 2020)
- Westmeath Pl Ref. **19/6104**: Construction of a new two storey type dwelling, domestic garage, installation of a new septic tank & percolation area, new vehicular entrance and all ancillary site services (Final Grant – 13th August 2019)
- Meath Pl Ref. **21/1274**: The construction of 4 bay slatted shed for agricultural use and all associated site works (Final Grant – 7th October 2021);
- Westmeath Pl Ref. **21/380**: Single storey dwelling & install a proprietary wastewater treatment system and all associated site development works (Notification of Grant - 29.10.2021);
- Westmeath Pl Ref. **21/401**: Extension of Duration - Erection of a slatted shed, roofed dungstead, silage slab and ancillary site works (Final Grant – 3rd September 2021)
- Meath Pl Ref. **21/1324**: An extension to the existing dwelling to include a part single storey / part dormer extension to rear, single storey extension to front / side, new front porch together with modifications to the existing elevations and internal plan layout (Notification of Grant – 18th October 2021)
- Westmeath Pl Ref. **21/506**: Retain existing conservatory to south (Notification of Grant – 2nd November 2021)
- Westmeath Pl Ref. **20/6054**: Construction of a 83.9m^2 extension to existing storey and a half type dwelling and all ancillary site services. (Final Grant - July 30, 2020)
- Meath Pl Ref. **21/1324**: an extension to the existing dwelling to include a part single storey / part dormer extension to rear, single storey extension to front / side, new front porch together with modifications to the existing elevations and internal plan layout. The development also includes construction of detached domestic garage, de-commissioning of the existing septic tank and percolation area, and installation of a new septic tank and percolation area, modifications and upgrade works to existing domestic entrance together with all associated site works (Granted - November 29, 2021)
- Westmeath Pl Ref. **20/6221**: Retention permission and permission for development at this site as follows: (i) retention of existing 80 metre meteorological mast which was erected as exempted development in accordance with Class 20A, Schedule 2 of the planning and development regulations 2001 (as amended) and all ancillary infrastructure and associated site development and reinstatement works and (ii) the

increase in height of the existing meteorological mast from 80 metres to a maximum height of up to 100 metres. Existing access arrangements using agricultural access tracks, will remain unaltered. The operational lifetime of the proposed development will be up to five years (Retention)

- Westmeath Pl Ref. **20/6226**: Retention permission for external milk tank adjacent to existing milking parlour and all associated site works (Granted - November 24, 2020)
- Westmeath Pl Ref. **20/6242**: One number residential dwelling consisting of two-part single, one-part two-storey house, associated garage/shed/workshop, approved wastewater treatment system and percolation area to EPA standard and new vehicular entrance (Granted - February 24, 2021)
- Meath Pl Ref. **21/2428**: renovation of the existing dwelling and the construction of a new connecting two storey dwelling, upgrading of the existing entrance to facilitate entrance piers and gates, the installation of a packaged wastewater treatment system and polishing filter, and associated site works (Granted - April 7, 2022)
- Meath Pl Ref. **21/281**: development consists of a Sheep Shed with Sheep Handling Yard, Meal Storage Bin, Concrete Apron, Farm Access Road, Agricultural Entrance and all site works (Granted - May 19, 2021)
- Westmeath Pl Ref. **21/620**: Retention permission for continued use of an existing Guyed Wind Monitoring Mast with instruments, 100m in height on its lands at Lisclogher Bog, Lisclogher Great, Co. Westmeath for a further period of three years. The purpose of the mast is to assess the suitability of the company's adjacent lands for wind farm development. Previous planning application reference number 16/6259 refers. (Granted - February 23, 2022)
- Westmeath Pl Ref. **21/659**: for a private dwelling house, proprietary effluent treatment system and percolation area, domestic garage, entrance onto public road and all ancillary site services (Granted - April 13, 2022)
- Meath Pl Ref. **22/1656**: amendments to planning register no. 21/2428. The amendments include the increase in footprint and height of the new connecting dwelling (Granted - March 28, 2023)
- Westmeath Pl Ref. **22/245**: construction of agricultural shed consisting of cubicles, feeding area and underground slatted slurry storage tanks and all associated site works (Granted - August 15, 2022)
- Westmeath Pl Ref. **22/550**: to construct one number detached single storey dwelling, one number detached single storey garage, to create new entrance to public road, to connect to public watermain, to install a septic tank and percolation area and all associated site works (Granted - May 3, 2023)
- Meath Pl Ref. **23/1042**: the construction of a two-storey style dwelling, detached domestic garage, a domestic wastewater disposal system, new site entrance and all associated site works (Granted - February 29, 2024)
- Meath Pl Ref. **23/254**: detached domestic store shed/garage incorporating plant room area and home office with non-habitable loft storage space overhead. The development also includes p.v. solar panels on north east and south west elevations together with all associated site works (Granted - June 12, 2023)
- Meath Pl Ref. **23/297**: the construction of a one and a half storey, 4-bedroom dwelling, a domestic garage, use existing site access, new percolation area and treatment system and all associated site works. Significant further information/revised plans submitted on this application (Granted - January 22, 2024)
- Meath Pl Ref. **23/60242**: The development will consist of the renovation and extension to an existing detached bungalow and outbuildings, the installation of a wastewater treatment system and polishing filter, upgrading of existing entrance off the public road and all ancillary site works. (Granted - January 4, 2024)
- Meath Pl Ref. **23/60401**: construction of a new bungalow type dwelling house, domestic garage, new vehicular entrance, septic tank and percolation area and all associated ancillary site works (Granted – not yet granted)

The proposed Ballivor Wind Farm planning application was lodged in 2023 to An Bord Pleanála (ABP Case No. 316212). The planning application for the proposed wind farm was accompanied by an EIAR and NIS, and contained mitigation measures to ensure that there will be no significant impacts on biodiversity, water quality or Designated Sites.

The consented Bracklyn Wind Farm (PL25M.311565), comprising 9 no. wind turbines with an overall tip height of 185m is located immediately south of Lisclogher West Bog and immediately north and west of Bracklin Bog. By virtue of its proximity to the Application Site, the Bracklyn Wind Farm has been considered within this cumulative impact assessment. Other infrastructural developments, including but not limited to the below, have been assessed on a pre-cautionary basis and considered, where deemed appropriate, within the supporting environmental cumulative assessments.

- N51 Higginstown to Earlsmeadow pavement works (5km from Application Site)
- N51 Dunmoe Phase 2 Realignment Scheme (c. 26 km from Application Site)

In the years since development commenced, small scale forestry in the form of conifer plantations as well as private turbary and agricultural development has been ongoing in the wider area.

6.7.3 Assessment of Cumulative Effects

Following the assessment provided in the preceding sections, other than for impacts on remnant raised bog in Lisclogher West during the Peat Extraction Phase, it is concluded that, the Project has not and will not result in any likely significant negative effects on biodiversity either within the Application Site or outside it. Having considered other projects in the area as listed in Appendix 2-2 of the EIAR and above, no potential for the development to contribute or have contributed to any likely significant negative cumulative effects on biodiversity was identified when considered in-combination with other plans and projects.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or negative cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Project.

The implementation of the Cutaway Bog Decommissioning and Rehabilitation plans and the ongoing Peatland Climate Action Scheme (PCAS), as detailed in Section 6.4.2.2, will have a Long-Term Significant Positive Effect on the raised bog habitats within the Application Site as well as on downstream water quality and therefore will not contribute to any negative effects on biodiversity when considered cumulatively with other projects and plans.

With regards to historical cumulative impacts, the original drainage and cutting of the acrotelm at Ballivor Bog Group from 1948 to July 1988 is likely to have resulted in a profound, negative effect on the raised bog habitat (and associated marginal habitats such as fen and bog woodland) that was present, particularly in the earlier years when the majority of the drainage of the Application Site was undertaken. The impact assessment provided in Section 6.5. above in relation to raised bog habitat (and associated habitats and fauna) and potential impacts thereon due to peat extraction activities and all ancillary works within the Application Site from July 1988 to June 2020 (the Peat Extraction Phase) concluded that ongoing operations during this time period are unlikely to have had a Significant Residual Effect on the vast majority of the remaining uncut raised bog habitats at the Application Site, which were highly modified from their natural state and in general of lower biodiversity value than the intact raised bog habitats that would have been on site prior to peat extraction activities.

Considering the profound loss of raised bog prior to July 1988, continued activity between July 1988 and June 2020 is likely to have had a Slight Negative Effect on biodiversity, when compared to impacts prior to July 1988 i.e. prior to the Project. Therefore, it is considered that there was no potential for peat extraction activities and all ancillary works during the Peat Extraction Phase of the Project i.e. between July 1988 and June 2020, to have contributed to any likely significant negative cumulative effects on biodiversity.

6.8 Conclusion

By 1988, peat extraction activities and all ancillary works at the Application Site were well established and the Application Site consisted predominantly of a large area of cutover bog, comprising bare peat and smaller areas of revegetating scrub, woodland and pioneer habitats of open cutaway bog.

The Peat Extraction Phase between 1988 and the present day was unlikely to have had a significant negative effect on the habitats, flora and fauna that occurred at the site as these were by 1988 highly modified from their original state, due to either drainage, fragmentation, removal of the acrotelm or peat extraction and in the case of bird species due to loss of habitat.

The Current Phase of the Project, which includes all operations from 2000 to the present day, has been licenced under IPC Licence (No. P0501) and has been subject to the conditions of that licence. The licence conditions, relating to operation and monitoring, emissions to water and air, water protection, waste management and bog rehabilitation, are intended for the protection, and where possible, the improvement of the environment. With the implementation of the conditions of the IPC Licence, and the much-reduced activity within the Application Site during this time, no significant effects on biodiversity are expected to have occurred during the Current Phase of the Project.

The Remedial Phase of the Project, which includes proposed rehabilitation plans for the Application Site which have also been assessed in this chapter, will generally involve the rewetting and revegetation of the bogs through natural succession. These plans will have a Long-term Significant Positive Effect on the habitats and biodiversity within the Application Site, as well as on water quality (as per the conclusions of Chapter 8: Hydrology and Hydrogeology), within and downstream of the site.

7. LAND SOILS AND GEOLOGY

7.1 Introduction

7.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO) to provide a description and assessment of the residual direct and indirect actual, and potential effects of the peat extraction activities and all ancillary works at the Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs (the 'Application Site') on the soil and geological environment, from 1988 to the present day. This chapter will also assess the potential impacts of the proposed rehabilitation plans for the Application Site following the cessation of peat extraction activities and all ancillary works in 2020.

The Application Site is located within the Ballivor Bog Group and is situated between the towns of Raharney and Delvin, Co. Westmeath and Ballivor, Co. Meath.

As stated in Chapter 4, July 1988 is the baseline environment 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 remedial environmental impact assessment report (rEIAR) on any of the activities occurring at the Application Site prior to the required transposition of the EIA Directive. Nevertheless, for completion, we provide a brief overview of the activities occurring at the Application Site from 1948 and the onset of site preparation works up to July 1988. The baseline land, soils and geological environment in the year 1988 is then described in detail along with a description of activities from 1988 to the cessation of peat extraction activities and all ancillary works in June of 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future.

This chapter presents:

- An assessment of impacts of the peat extraction activities and all ancillary works on the land, soils and geological environment;
- The baseline sensitivity of the receiving land, soils and geological environment has been assessed based on the baseline site conditions occurring in 1988;
- The impacts of the receiving land, soils and geological environment have been assessed over 3 no. Phases of the life cycle of the project. These phases include the Peat Extraction Phase (July 1988 – June 2020), the Current Phase post extraction (June 2020 – present day) and the Remedial Phase as described in Chapter 4;
- The monitoring and control measures that were implemented during the Peat Extraction Phase from July 1988 to June 2020;
- The control and monitoring measures during the Current Phase (June 2020 to present day)
- The proposed mitigation measures associated with the proposed Decommissioning and Rehabilitation Plan (Remedial Phase); and,
- The residual effects along with the cumulative effects with relevant projects in the vicinity of the Application Site.

7.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core areas of expertise and experience includes soils, subsoils and geology. We routinely complete impact assessments for land, soils and geology, hydrology and hydrogeology for a large variety of project types including wind farms and renewable energy projects on peatlands.

This chapter of the rEIAR was prepared by Michael Gill and Conor McGettigan.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. For example, Michael has worked on the EIARs for Oweninny WF, Cloncreen WF, and Yellow River WF, and over 120 other wind farm related projects across the country. Michael has also worked on rEIARs for Cleanrath WF, 41 no. Bord na Móna (the Applicant) bogs, and also for a number of quarry sites.

Conor McGettigan (BSc, MSc) is an Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin, graduating with a First-Class Honours degree. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin (First Class Honours). Conor has completed numerous land, soils and geology chapters for several developments on peatlands. Conor has also completed geological and hydrological studies on sensitive peatlands sites, including Clonaslee Bog, the Liffey Head Project, and Keerglen WF and Kilsallagh WF.

7.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Section 2.6 of Chapter 2 of the rEIAR. Consultation responses relating to the land, soils and geological environment were received from the Geological Survey of Ireland. A summary of the response is below. Further details are outlined in Section 2.6.2 of Chapter 2 of this rEIAR.

Geological Survey of Ireland

A scoping request was sent to the Geological Survey of Ireland (GSI) on the 2nd of December 2021 and again on the 14th February 2024. A response was received on the 21st of December 2021 and on the 28th of February 2024 which comprised the following:

- List of relevant available datasets,
- Recommend referring to GSI Groundwater and Geothermal Unit run GW Climate project which is a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland. This is a follow on from a previous project (GWFlood)
- Requested copy of reports detailing any site investigations carried out.

7.1.4 Relevant Legislation

The rEIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

- Planning and Development Acts, 2000-2022;
- Planning and Development Regulations, 2001 (as amended);
- 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);

- S.I. No. 296/2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018;
- European Communities (Environmental Impact Assessment) Regulations 1989 to 2006; and,
- S.I. No. 4/1995: The Heritage Act 1995, as amended.

7.1.5 Relevant Guidance

The land, soils and geology chapter of this rEIAR was prepared having regard, where relevant, to guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements;
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the information to be contained in Environmental Impact Statements);
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

7.2 Methodology

7.2.1 Desk Study

A desk study of the Application Site and the surrounding area was completed in late 2021 and early 2022 to collect all relevant geological data for the Application Site and surrounding area. The desk study was checked and updated where required in March 2024. This study included consultation with the following data sources:

- Integrated Pollution Control Licence (IPC) Derrygreenagh Bog Group (Ref: P0501-01) Environmental Protection Agency, Appendix 4-1;
- Bord na Móna Rehabilitation Plans, Appendix 4-2;
    - Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan;
    - Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan;
    - Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan;
    - Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan; and,
    - Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan.
- Bord na Móna Annual Reports which contain information relevant to the Application Site;

- Annual Environmental Reports 2001-2023 **Appendix 4-3** (note that 2018 to 2023 are also publicly available[1])
- IPC Licence P0501-01 Application 1999 (Available at EPA Headquarters on request);
- Inspection of production records at Ballivor Works;
- Aerial Maps from 1973 to 2020, Appendix 4-4;
- Bord na Móna databases on peat depth and drainage;
- Bord na Móna Lidar data;
- Corine Land Cover and Land Cover Change Maps (www.land.copernicus.eu);
- Environmental Protection Agency soils and subsoils mapping (www.epa.ie);
- Geological Survey of Ireland – Geological databases (www.gsi.ie); and,
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 13 (Geology of Meath). Geological Survey of Ireland (GSI, 2003).

7.2.2 Monitoring and Site Investigation Data

HES completed site inspections and walkover surveys at the Application Site as part of this remedial Environmental Impact Assessment (rEIAR) and to inform the proposed Ballivor Wind Farm planning application. These site investigations comprised of peat probing, geological mapping and detailed walkover surveys completed by HES on 18th May 2020, 15th – 17th September 2020, 05th October 2020, 01st December 2020, 22nd March 2021, 01st April 2021, 20th September 2021, 28th October 2021 and 19th January 2022.

In addition to the site investigations completed by HES, several additional site investigations have been completed at the Application Site to further inform this rEIAR and the proposed Ballivor Wind Farm application. These site investigations included peat probing investigations completed by Fehily Timoney (FT) during walkover surveys on 8th - 10th June and 22nd - 24th June 2021. Ground investigations in the form of trial pits and boreholes were also carried out by FT and Irish Drilling Ltd (IDL) on 17th – 21st August 2020, 1st-16th February 2021, 19th July 2021 and 5th-11th August 2021. In addition, the Applicant undertook trial pitting on the 18th – 19th March 2021.

The combined geological dataset collated by HES, FT, IDL and the Applicant have been used in the preparation of this rEIAR Chapter.

In summary, site investigations to address the land, soils and geology chapter of the rEIAR include the following:

- A total of 457 no. peat probe depths/investigations points were carried out by HES, MKO and FT in Ballivor, Carranstown, Bracklin and Lisclogher Bogs. No peat probing investigations have been completed in Lisclogher West;
- 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;
- Ground investigations completed by FT and IDL in the form of 78 no. trial pits, 16 no. boreholes and 5 no. rotary coreholes; and
- Completion of 24 no. trial pits excavated by the Applicant.

Site-specific data obtained by HES was supplemented with recent and historic site-specific data supplied by the Applicant. These data include habitat, soils/land, lidar and topographic maps for the Application Site. The maps are included in the Cutaway Bog Decommissioning and Rehabilitation Plans attached as Appendix 4-2. The Applicant have also provided volumes of peat extracted for the Application Site that are utilised in the preparation of this rEIAR Chapter.

[1] *Annual Environmental Reports 2008-2021 can be found at the following link: https://epawebapp.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0501-01&classification=Enforcement*

7.2.3 Impact Assessment Methodology

Using information from the desk study and data from the site investigations, an assessment of the importance of the soil and geological environment within the Application Site is assessed using the criteria set out in

Table 7-1 (NRA, 2008).

Table 7-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

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.
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. Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site). Well drained and/or highly 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.
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 landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral Resource.

The EPA Guideline criteria (EPA, 2022) for the assessment of likely significant effects require that likely effects are described with respect to their extent, magnitude, type (i.e. negative, positive or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this rEIAR are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 of this rEIAR.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of effects are related to examples of potential likely significant effects on the geology and morphology of the receiving environment, as listed in Table 7-2.

Table 7-2: Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Geological and Hydrological Impacts
Quality	Significance	
Negative only	Profound	Widespread permanent impact on: › The extent or morphology of a cSAC. › Regionally important aquifers. › Extents of floodplains. Mitigation measures are unlikely to remove such impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: › The extent or morphology of a cSAC / ecologically important area. › A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). › Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: › The extent or morphology of a cSAC / NHA / ecologically important area. › A minor hydrogeological feature. › Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

7.3 Establishing the Baseline Conditions

7.3.1 Site Location

The Application Site is situated on the Meath-Westmeath border, and comprises 5 no. Bord na Móna bogs which are part of the Ballivor Bog Group, which is a subset of the larger Derrygreenagh Bog Group. The bogs comprising the Application Site include Ballivor Bog to the south, Carranstown and Bracklin bogs towards the centre and Lisclogher and Lisclogher West bogs at the northern end of the site. Please see Chapter 4 for a more detailed description of the site location.

7.3.2 Topography

7.3.2.1 Original Topography

The topography across the Application Site prior to the onset of peat extraction activities and all ancillary works (1948) is estimated to be 72 – 89mOD. These estimations have been deduced from the current topography for Lisclogher West, which has never been subject to peat extraction, the relatively uniform low-lying nature of the Application Site and the surrounding landscape, and the presence of benchmark notes on historical 25" OSI mapping (1897 – 1913) and Cassini 6" (1940s) mapping from the area. No detailed elevation survey of these bogs are available from before peat extraction activities and all ancillary works began by the Applicant.

The estimated topographic changes through time for each individual bog are shown in

Table 7-3 below.

Table 7-3: Estimated Topographic Changes at the Application Site

Bog Name	Pre-Extraction (1948))	1988 Topographic Range	2020 Topographic Range (mOD)
Ballivor	72 – 89	74 - 82	69 – 79
Carranstown	72 – 89	72 - 78	69 – 78
Bracklin	72 – 89	75 – 89	71 – 84
Lisclogher	72 – 89	73 - 79	70 – 79
Lisclogher West	72 – 89	77 - 82	74 – 84

7.3.2.2 1988 Baseline Topography

Historically, the topographic profile of the Application Site was higher than that observed today with the topographic changes varying from across the site depending on a particular bogs extraction history (refer to Chapter 4). For example, peat extraction activities and all ancillary works commenced in Ballivor Bog in 1953 while Lisclogher West, despite being drained, was never subject to peat extraction. Therefore, it is reasonable to conclude that Ballivor Bog will have experienced a greater change in topography associated with peat extraction activities than Lisclogher West.

As described in Chapter 4, the topography of the Application Site in 1988, is based on an average depth of milled peat extraction of 0.1-0.2m per year over the 32-year period from 1988 to the cessation of peat extraction activities and all ancillary works in 2020. As seen in

Table 7-3 above, the baseline topography of the Application Site ranges from 69 – 84mOD, with the greatest elevations located at Bracklin bog towards the centre of the site.

All areas of the Application Site will have experienced some decrease in topography since 1988 due to the installation of drainage, and with the exception of at Lisclogher West, the removal of peat during peat extraction activities and all ancillary works. Despite having never been subject to peat extraction activities and all ancillary works, Lisclogher West will likely have experienced some topographic decrease associated with drainage and subsidence. Regan et al. (2019) observed continued subsidence of 4-6mm/year of a bog surface due to groundwater drainage, while Grzywna (2017) also recorded a subsidence rate of 6mm in a drained peatland. Applying a subsidence rate of 6mm/year to Lisclogher West, which was drained between 1973 and 1995, over the 32-year period from 1988 to 2020 it can be estimated that the baseline topography of Lisclogher West was ~0.2m higher that its current elevation.

7.3.2.3 Current Topography

The current topography of the Application Site is relatively flat with an elevation range of between approximately 69 and 86mOD (metres above Ordnance Datum). Topography at the site has been modified through the peat extraction activities and all ancillary works and associated drainage works. Today the highest elevations are found at headlands and remnant peat banks which create a boundary berm, forming a basin effect within the former extraction areas of the bogs. These remnant peat banks and headlands provide an approximation (albeit drained and subsided) of the original ground elevations which existed across the Application Site prior to the commencement of any peat extraction activities and all ancillary works.

The Applicant's lidar map for Ballivor Bog (refer to Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the current topography at Ballivor Bog. Currently the highest elevations at Ballivor Bog are found along its northern and southwestern margins where the topography ranges from ~75-79mOD. Ground elevations in the interior of the bog, which has been subject to historic peat extraction activities and all ancillary works, range from ~69-73mOD.

The Applicant's lidar map for Carranstown Bog (refer to Carranstown Bog 2022 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the current topography at Carranstown Bog. Currently the highest elevations at Carranstown Bog are found in the west, with maximum elevations ranging from ~68-75mOD. The topography slopes gently to the east, with the lowest elevations recorded in the northeast of Carranstown Bog (~69mOD).

The Applicant's lidar map for Bracklin Bog (refer to Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the current topography at Bracklin Bog. Currently the highest elevations at Bracklin Bog are located at Bracklin West where ground elevations range from ~71-86mOD. Ground elevations are lower in the east of Bracklin Bog where the topography ranges between ~71-78mOD.

The Applicant's lidar map for Lisclogher Bog (refer to Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the current topography at Lisclogher Bog. Currently the highest elevations at Lisclogher Bog are found along the headlands located at its northern, western and southern margins (~78mOD). The lowest topography is located towards the centre of the bog where elevations range from ~70-72mOD.

The Applicant's lidar map for Lisclogher West (refer to Lisclogher West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the current topography at Lisclogher West. Ground elevations at Lisclogher West range from ~74mOD in the southeast to ~82mOD in the northwest.

7.3.3 Land (Land take)

7.3.3.1 Land - Historical Change Summary

The primary change to land during the peat extraction activities and all ancillary works process occurs during the initial drainage of the bog and the removal of vegetation in advance of peat extraction activities and all ancillary works. 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). At this time, ancillary features will also be constructed including railway lines, machine passes, canteens, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks and peat loading facilities. After the site is drained vegetation will be removed from the bog surface, leaving only bare peat fields between the drains. During the operational phase of the peat extraction activities and all ancillary works process only minimal soils/land change occurs and may involve a change in the type of peat extraction activities and all ancillary works *i.e.* sod or milled peat extraction. During peat

extraction activities and all ancillary works minor topographic changes have occurred annually due to the removal of peat from active extraction areas. The peat extraction activity and all ancillary works does also prevent rehabilitation of the underlying peatland.

Land take and any land changes within the Application Site have been investigated using available aerial photographs dating from 1973 to the most recently available photographs (2020). The Applicant's Annual Reports were also consulted to help develop the timeline of changes across the Application Site. The observed changes in land and land take for the individual bogs comprising the Application Site are discussed in the following paragraphs and in Table 7-4 and Table 7-5.

The first drainage and initiation of peat extraction activities and all ancillary works occurred in Ballivor Bog in 1948 and 1953 respectively. At this time Ballivor Bog would have experienced a relatively abrupt land cover change (land take) from raised bog to commercial peat extraction. The earliest available aerial photograph dating from 1973 shows the west of Ballivor Bog to be under sod peat extraction, with an area of remnant bog existing in the east which has already been drained through the use of drainage ditches. An aerial photograph dating from 1995 shows the northeast, east and south of the bog under milled peat extraction. At this time, the west of the bog remained under sod peat extraction. Subsequent aerial photographs from 1995 to present do not record any major land changes at Ballivor Bog with the exception of some revegetation (regrowth) in the southwest of the bog. This indicates that sod peat extraction has ceased for some time in this area. Peat extraction activities and all ancillary works ceased at Ballivor Bog in June 2020.

Carranstown Bog appears as undeveloped bog (with turbary cutting along the northeastern and southeastern edges) in the 1973 aerial photograph. According to the Applicant's Annual Reports drainage and site preparation works at Carranstown Bog predate 1988. However, while drainage was installed in the easter portion of Carranstown prior to 1988, the removal of vegetation occurred at a later date in this area (1988-1995). Peat extraction activities and all ancillary works had been initiated in the western portion of Carranstown bog by 1988, while peat extraction activities and all ancillary works had begun prior to 1995 in the eastern portion of Carranstown bog. According to the Applicant's Cutaway Bog Decommissioning and Rehabilitation Plan for Carranstown Bog (2022) the bog has been used for sod peat in the past but has been developed for milled peat for some time. An aerial photograph dating from 1995 shows Carranstown Bog to be under milled peat extraction. No major land changes are recorded in subsequent aerial photographs with the exception of increased vegetation growth along drainage channels in recent years. Peat extraction activities and all ancillary works ceased at Carranstown Bog in June 2020.

Site preparation works were undertaken in the main area of Bracklin Bog beginning in 1950, with 1957 being the first year of commercial peat extraction at Bracklin. The earliest aerial photographs of Bracklin date from 1973 and show some sod peat extraction in the main bog area with undeveloped bog remaining in the western portion of Bracklin bog. According to the Applicant's Draft Cutaway Bog Decommissioning and Rehabilitation Plan for Bracklin Bog (2024) the main bog area was formerly used for sod peat and was never subject to milled peat extraction. Peat extraction activities and all ancillary activities in the main bog area had ceased by 2000. The western portion of Bracklin bog has been used for milled peat extraction with drainage and ditching preceding 1988, when milled production fields in the southern portion of the bog are identifiable from aerial photographs. However, the northwestern portion of Bracklin bog had been drained but not yet cleared of vegetation by this time. In 2000, signs of vegetation recovery can be identified in the main bog area with sod production ceasing here between 1995 and 2000. The western portion of Bracklin bog remained under milled peat extraction up until June 2020.

The Applicant's records indicate that site preparation works were implemented at Lisclogher Bog in 1950, with 1960 being the first year of commercial peat extraction. The earliest available aerial photograph of Lisclogher Bog, dating from 1973, shows that the bog was already under sod peat extraction at this time. Milled peat extraction activities and all ancillary works was ceased at Lisclogher Bog in March 2003, while third party sod peat extraction continued in the northeast of the bog until

2020. The most recent aerial photographs (2000-2020) show that Lisclogher Bog has begun to become recolonised with vegetation.

The earliest available photograph, dating from 1973, shows Lisclogher-West as undeveloped bog, with some minor turbary cutting along the bog edges. Based on aerial photographs Lisclogher West was drained at some time between 1973 and 1995. However, this bog was never subject to peat extraction activities and all ancillary works. The absence of peat extraction activities and all ancillary works has meant that Lisclogher-West has retained many of its natural raised bog features, although there has been significant degradation, and the remnant bog is relatively dry with deep field drains. No land changes will have occurred at Lisclogher Bog since the site preparation works (1973 – 1995).

Table 7-4: First Drainage and First Production Years of the Ballivor Bog Group

Bog Name	Bog Area (ha)	Commencement of Site Preparation works (removal of vegetation and drainage insertion)	Extraction Began
Ballivor	638	1948 - 1953	1953
Carranstown	304	West: 1974 – 1987 East: Drainage between 1974 – 1987; clearance postdating 1989–1995	West: Prior to 1988 (western side) East: By1995
Bracklin	772	Main Bracklin Bog Area: 1950 Bracklin West: drained prior to 1988, vegetation clearance in southern portion only by 1988	Main Bracklin Bog Area: 1959 Between 1989 and 1995 at northern portion of Bracklin West By 1988* at southern portion of Bracklin West
Lisclogher	479	1950	1960
Lisclogher West	238	Minor works commenced in 1973 Main Drainage installed between 1973 and 1988 Drainage was complete post 1988*	N/A

**Land - indicated by aerial photography*

7.3.3.2 Pre-Extraction

It is assumed that prior to the onset of drainage and peat extraction activities and all ancillary works that the Application Site was predominantly comprised of undeveloped raised bog with probable minor turbary cutting along bog edges.

Table 7-6 below details the land/land cover use changes over the Peat Extraction Phase, Current Phase, and Remedial Phase.

Table 7-5: Land / Landcover change through time

Bog Name	Pre-Extraction Land	1973	1988 (Baseline)	1995	2000	2000-2020
Ballivor	High raised bog, with likely minor turbary cutting along bog edges	Area of sod peat extraction in the west Remnant bog in the northeast which shows some ditching for milled peat extraction	Sod and milled peat extraction	Milled peat extraction in the northeast, east and south Sod peat extraction in the centre and west	No change Same as in 1995	No change Same as in 1995
Carranstown	High raised bog, with likely minor turbary cutting along bog edges	Remnant bog, with turbary cutting along northeast and southeast bog edges	Milled peat extraction in the west Remnant bog in the east, drainage already inserted for milled extraction, no vegetation clearance yet	Milled peat extraction	No change, same as 1995	Drainage channels appear to have become overgrown with vegetation Significant growth of forestry around bog perimeter through same period.
Bracklin	High raised bog, with likely minor turbary cutting along bog edges	Sod peat extraction Bracklin West is remnant bog with some ditches for milling identifiable	Predominantly sod peat extraction Southern portion of Bracklin West in milled peat extraction Northern portion of Bracklin West drainage already inserted for milled peat extraction. No vegetation clearance yet	Peat extraction activities and all ancillary works has ceased across the majority of the bog Bracklin West (north and south) is under milled peat extraction	Signs of vegetation recovery across some of the bog Bracklin West remains in milled peat extraction	Drainage channels appear to have become overgrown with vegetation Significant growth of forestry around bog perimeter through same period. Bracklin West remains in milled peat extraction
Lisclogher	High raised bog, with likely minor turbary cutting along bog edges	Sod peat extraction Some areas of remnant raised bog in the north	Sod peat extraction	Sod and milled peat extraction fields	Milled peat extraction fields Signs of vegetation recovery	Drainage channels appear to have become overgrown with vegetation

Bog Name	Pre-Extraction Land	1973	1988 (Baseline)	1995	2000	2000-2020
Lisclogher West	High raised bog, with likely minor turbary cutting along bog edges	Remnant bog, with turbary cutting along bog edges	Remnant bog	Some drainage for milled peat extraction Vegetation still present	No change Same as in 1995	No change Same as in 1995

7.3.3.3 Land - 1988 Baseline

As described in Chapter 4, by 1988 the landuse and landcover at the Application Site was well established as being industrial peat extraction activities and all ancillary works. At this point in time, 4 no. bogs (Ballivor, Bracklin, Carranstown and Lisclogher) had been drained to facilitate peat extraction activities and all ancillary works, with both milled and sod peat extraction being established in these bogs. Furthermore, railway infrastructure was present across these 4 no. bogs to allow for the movement of materials across the Application Site. In contrast, Lisclogher-West had not been fully drained by 1988 and remained as raised bog.

The main entrance to the Application Site at this time was located north and south off the Ballivor – Raharney (R156) road. The Ballivor Works depot, located in the north of Ballivor Bog, and outside of the Application Site boundary, was also present at this time comprising a peat processing plant, canteen, storage sheds and maintenance buildings.

The following paragraphs provide further detail on the baseline (1988) land / landcover at the Application Site.

Satellite imagery and Annual Reports provided by the Applicant indicate that by 1988, Ballivor Bog was undergoing sod and milled peat extraction. The rail infrastructure required for the peat extraction activities and all ancillary works was already in situ, having been laid on Ballivor Bog during the 1950s. The railway line extended from the Ballivor Works (the Works), located in the north of the bog, southwards into the bog interior. The Works comprised several peat processing buildings, canteen and welfare facilities, waste storage areas, carparking facilities and a refuelling area. At this point, Ballivor Bog had already been drained and the Applicant's Annual Reports note that 2 no. pumps were in operation at this time. The bog included 7 no. artificial silt ponds, and 7 no. surface water emission points which remain today. Therefore, the main landcover type at Ballivor Bog in 1988 was cutover peat with several small areas of remnant uncut bog remained along edges of the bog.

Meanwhile, the majority of peat extraction activities and all ancillary works had ceased in Bracklin Bog by 1988 with the exception of milled peat extraction in the southwestern portion (refer to Chapter 4). At this time the rail infrastructure and drainage required for peat extraction activities and all ancillary works would already have been in place during the 1950s and 1960s. The bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain today. Landcover at this time in Bracklin Bog would have comprised largely of bare peat fields with some areas of remnant uncut bog around the edges of the bog. Meanwhile the northern section of Bracklin West was yet to be cleared of vegetation.

Aerial imagery from 1988 indicates that drainage and extraction for milled peat was underway in the western portion of Carranstown Bog. At this time Carranstown Bog was linked to Ballivor Bog to the south and Bracklin Bog to the north via railway infrastructure. The western portion of Carranstown Bog included 5 no. artificial silt ponds, and 4 no. surface water emission point. While drainage has been inserted into all of Carranstown Bog by 1988, vegetation clearance had yet to be undertaken in the eastern portion of Carranstown.

By 1988, the centre of Lisclogher Bog has been drained and sod peat extraction was underway. The extremities of the bogs were not subject to peat extraction activities and all ancillary works and comprised mainly remnant bog, wet flush areas, and bog woodland. A section of birch woodland was located at the southern end of the bog, located in a small valley between two sections of remnant bog. Railway infrastructure was *insitu*, connecting the bog to Bracklin to the west, across a local road.

In accordance with aerial imagery, some drainage had been inserted at Lisclogher West by 1973, and thus 1988. However, in order to assess a precautionary scenario associated with the Project, it is assumed that drainage was inserted in Lisclogher West from 1988 onwards. No large scale peat extraction was taking place at Lisclogher West. Therefore, the bog landcover in 1988 comprised

mainly natural raised bog with raised bog features such as raised bog, conifer plantation, birch woodland, mixed broadleaf, scrub, poor fen and flush areas particularly at the bog borders. As the bog was not brought into peat extraction it is assumed that the existing topography is representative of the topography in 1988.

7.3.3.4 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 Application Site comprises primarily of agricultural lands with 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 Application 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 Ballivor to the east and Raharney to the west. Corine also map a mineral extraction site to the southwest of Ballivor Bog in the townland of Riverdale.

The following paragraphs discuss the current land cover at each of the 5 no. bogs comprising the Application Site.

Ballivor Bog has a total area of 638ha and had an area of 473ha which was subject to peat extraction activities and all ancillary works until June 2020. Therefore, following the cessation of peat extraction activities and all ancillary works, the landuse/land cover in this former extraction area (~473ha) changed from peat extraction activities and all ancillary works to areas of bare peat which are available for re-vegetation. The surface of Ballivor Bog is currently drained by a series of northwest-southeast orientated drains spaced at approximately 15m intervals. Railway infrastructure was laid in the bog (since the 1950s), terminating at the Works building located in the north of Ballivor Bog, just off the Ballivor-Raharney (R156) road. The Works area housed several peat processing buildings, canteen and welfare facilities, waste storage areas, carparking facilities and a refuelling area. The Applicant's current habitat map (refer to Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows the existing land cover at Ballivor. Much of the centre and northeast 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 Ballivor 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 northwest and southwest of Ballivor Bog contain a mosaic of heath, heath and scrub and pioneer open cutaway habitats. Maps of the Applicant's historic peat extraction activities and all ancillary works areas (refer to Section 4.4 in Chapter 4 of the rEIAR) show that extraction ceased in these areas of Ballivor around 1988. Therefore given the time which has elapsed since peat extraction activities and all ancillary works was ongoing, vegetation has had time to re-establish itself in these areas. Ballivor Bog is fringed by cutaway and cutover bog in the northeast and remnant bog with some areas of "birch woodland" in the southwest.

Carranstown Bog has a total area of 304ha and had a peat extraction activity and all ancillary works area of 80ha which was subject to peat extraction activities and all ancillary works until June 2020. A total of 117 hectares were drained but not subject to peat extraction activities and all ancillary works. Therefore, following the cessation of peat extraction activities and all ancillary works, the landuse/land cover in this former extraction area (~80ha) changed from peat extraction activities and all ancillary works areas to areas of bare peat which are available for re-vegetation. Carranstown is currently drained by a series of northwest-southeast orientated drains. A railway line dissects the Application Site from the R156 in the south in a north-westerly direction, joining Carranstown to Bracklin Bog to the north. The Applicant's current habitat map for Carranstown Bog (refer to Carranstown Bog 2022 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that much of the bog comprises of bare peat fields. Note that approximately three quarters of the bog was in milled peat extraction up to June 2020 and there has not been enough time for vegetation to colonise these areas post extraction. Meanwhile, to the east and west there are areas of heath, heath and scrub, and woodland.

Bracklin Bog has a total area of 772ha and had a peat extraction activities and all ancillary works area of 351ha which was subject to peat extraction activities and all ancillary works until 2003. Recent production was concentrated in a small section in the west of the bog, referred to as Bracklin West. Therefore, following the cessation of peat extraction activities and all ancillary works, the landuse/land cover in Bracklin West changed from peat extraction activities and all ancillary works areas to areas of bare peat which are available for re-vegetation. The bog is drained by a series of northeast-southwest orientated drains. Bracklin Bog is served by a railway line which extends to the north and west across Bracklin Bog. The Applicant's current habitat map for Bracklin (refer to Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that much of the main bog area currently comprises of a mosaic of heath, scrub, woodland, and pioneer open cutaway habitats. Maps of the Applicant's historic peat extraction activities and all ancillary works areas (refer to Section 4.4 in Chapter 4 of the rEIAR) show that extraction ceased in this main area of Bracklin prior to 2004. Therefore, given the time which has elapsed since extraction, vegetation has had time to re-establish itself in these areas. The western area of Bracklin currently comprises of bare peat fields, indicative of the recent peat extraction activities and all ancillary works in this area of the Application Site. Meanwhile, the south of Bracklin Bog contains some areas of birch woodland with areas of remnant high bog recorded along the northern margins of Bracklin Bog.

Lisclogher Bog has a total area of 479ha and sod peat extraction was underway across 378 hectares of the bog. While third party peat extraction activities and all ancillary works was ongoing in the northeast of the bog until 2020, milled peat extraction had ceased there in March 2003. Lisclogher is drained by a series of east-west orientated drains. The Applicant's 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan for Lisclogher East Bog (refer to Appendix 4-2) states that the drainage system is beginning to break down with many drains becoming blocked and filling with water. A railway line extends from Bracklin Bog to the south into the interior of Lisclogher Bog. The Applicant's current habitat map for Lisclogher shows that much of the bog is comprises a mosaic of pioneer open cutaway habitats, scrub and heath habitats. Vegetation has had time to recolonise much of Lisclogher, with the maps of the Bord na Móna historic peat extraction activities and all ancillary works areas showing that extraction ceased across much of Lisclogher by 2003. Some fingers of bare peat extend from the railway line to the east and west. These bare peat areas represent the former third party and private peat cutting which was facilitated on Lisclogher Bog up until 2020.

Lisclogher West has a total area of 228ha. Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approximately 22ha, as deduced from available aerial imagery. Lisclogher West was never subject to peat extraction. The existing remnant bog is relatively dry due to the presence of a series of northwest-southeast orientated drains. No railway line or production centres are present within Lisclogher West. The Applicant's current habitat map for Lisclogher West (refer to Lisclogher West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that majority of the site is classified as containing bog habitats, fringed to the north and south by woodland.

7.3.4 Peat/Soils and Subsoils

7.3.4.1 Current Environment

The published soils map (www.epa.ie) for the area shows that cutover/cutaway peat is mapped exclusively over the Application 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. Therefore, while the soil map shows cutover peat at Lisclogher West, we know from inspection of Annual Bord na Móna and site walkovers that this area of the Application Site has not been cut (i.e. not subject to peat extraction).

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.

The published subsoils map (www.gsi.ie) shows cut over raised peat (Cut) underlies the Application Site (however as described above Lisclogher West has not been subject to peat extraction). Other subsoil types mapped in the wider area include Glacial Tills derived from Limestone (TLs) and Gravels derived from Limestone (GLs). An area of Till derived from cherts (TCh) is mapped to the southeast of Lisclogher Bog.

A summary of the soils and subsoils in each bog are included in Table 7-6. A map of the local subsoil cover is attached as Figure 7-1.

Table 7-6: Summary of soils and subsoils at the Application Site

Bog Name	Soils	Subsoils
Ballivor	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.
Carranstown	Cutover peat surrounded by deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils and poorly drained soils with a peaty topsoil. Mineral alluvium is found along nearby watercourses.	Cutover peat surrounded by Tills derived from limestones and Alluvial deposits along streams/rivers.
Bracklin	Cutover peat surrounded by deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils and poorly drained soils with a peaty topsoil. An area of shallow well drained soils is mapped to the south of the bog. Mineral alluvium occurs along nearby watercourses.	Cutover peat surrounded by Tills derived from limestones, Alluvium along streams/rivers and some local limestone derived Gravels to the southwest. Some Till derived from chert is mapped to the east but remote from the bog boundary.
Lisclogher	Cutover peat surrounded by deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils, poorly drained soils with a peaty topsoil. An area of shallow well drained soils are mapped to the north and acid poorly drained soils to the southeast. Mineral alluvium occurs along nearby watercourses.	Cutover peat surrounded by limestone derived Till to the north and east. Alluvium deposits along streams/rivers. Local Gravels to the north and Till derived from Cherts to the southeast.
Lisclogher West	Peat (uncut) surrounded by deep well drained mineral soils with localised pockets of poorly drained soils with a peaty topsoil. Mineral alluvium occurs along nearby watercourses.	Peat (uncut) surrounded by limestone derived Tills with localised Gravel deposits to the south.

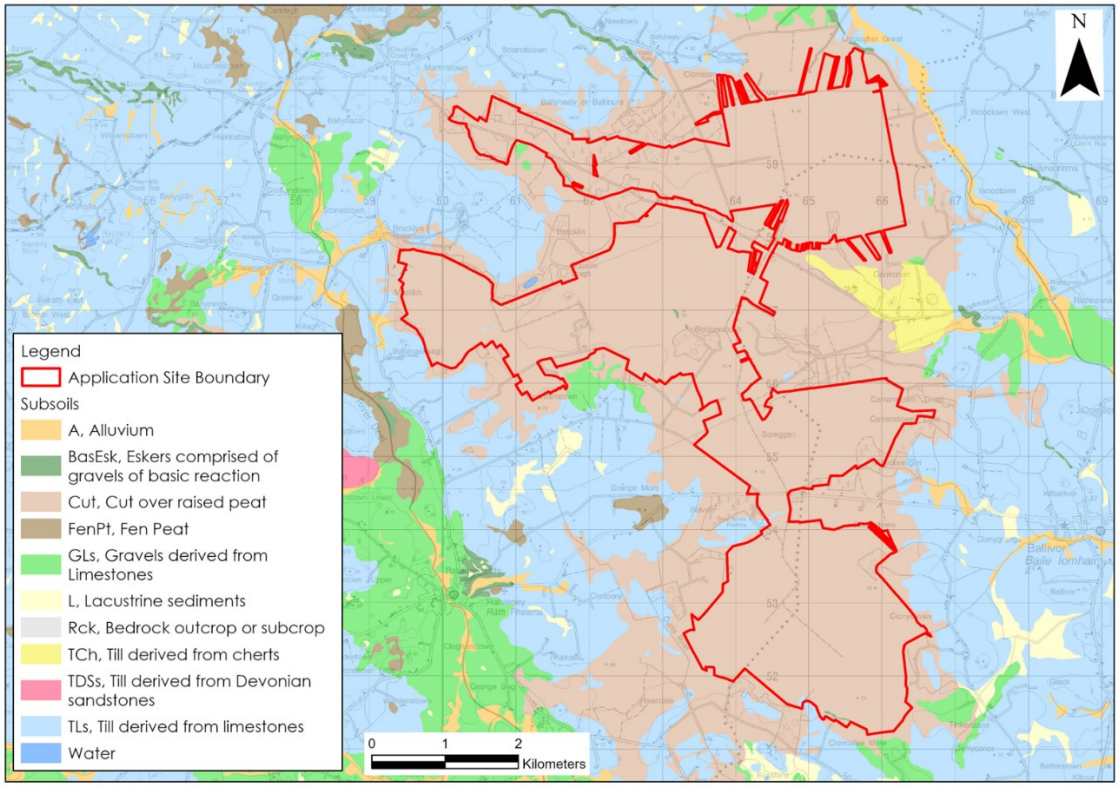


Figure 7-1: Local subsoils map

The soils and subsoils present at the Application Site have been verified during site walkover surveys and during intrusive site investigations completed as part of site investigations for the proposed Ballivor Wind Farm.

The presence of subsoil peat on-site has been confirmed by peat probing investigations conducted by HES in September 2020 and March 2021. Peat depth probing has also been completed by FT and MKO, and the entire dataset (457 no. peat probes) is discussed here.

Peat depth intervals recorded across the Application Site are shown on the bar chart presented as Figure 7-2. Overall peat depths ranged from 0.4 to 5.7m with an average of 1.93m (n= 457, σ = 0.96m). The subsoils encountered typically comprised of clay, sandy or gravelly mineral soils. Peat depth information for the individual bogs comprising the site is summarised in

Table 7-7. Peat depths at all site investigation points (HES, FT and MKO) in Ballivor Bog ranged from 0.4 – 5.0m with an average of 1.95m. Further north the peat depths in Carranstown ranged from 0.5 – 3.4m with an average of 1.55m. Peat depths ranged from 0.49 – 5.7m in Bracklin with an average peat depth of 2.07m. Peat depths in Lisclogher Bog ranged from 0.53 – 5.5m with an average peat depth of 1.95m. No peat probing investigations were conducted in Lisclogher West as no peat extraction was carried out in this area of the Application Site. Recorded peat depths across the Application Site is provided in Figure 7-3 below.

Table 7-7: Summary peat depths across the Application Site (HES, FT and MKO)

Bog Name	No. Peat Probes	Range (m)	Average (m)	Summary Subsoil Lithology
Ballivor	186	0.4 – 5.0	1.95	Clay or gravelly mineral soil
Carranstown	63	0.5 – 3.4	1.55	Clay or gravelly mineral soil

Bog Name	No. Peat Probes	Range (m)	Average (m)	Summary Subsoil Lithology
Bracklin	123	0.49 – 5.7	2.07	Sandy/gravelly mineral soil
Lisclogher	85	0.53 – 5.5	1.95	Sandy/gravelly mineral soil
Lisclogher West	-	-	-	-

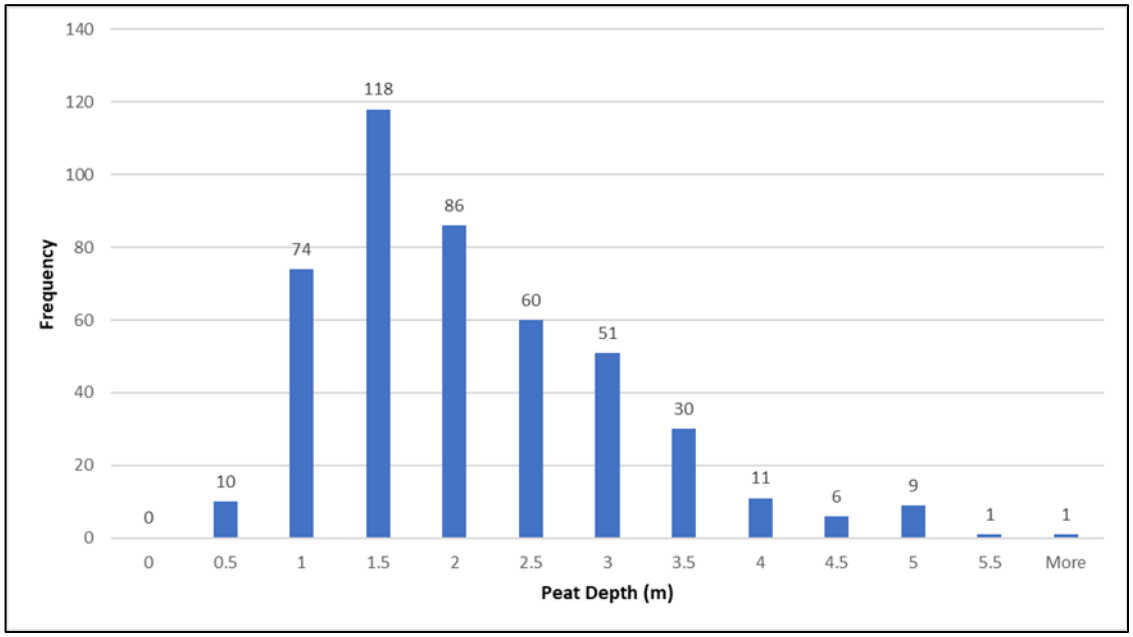


Figure 7-2: Residual Peat Depths at the Ballivor Bog Group (excluding Lisclogher West) (HES, FT and MKO peat probes))

Additionally, the Applicant has conducted peat probing investigations as part of the ecological reporting which formed the basis of the Cutaway Bog Decommissioning and Rehabilitation Plans (refer to Appendix 4-2). The surveying was completed over the time period from 2010 to 2016. The Cutaway Bog Decommissioning and Rehabilitation Plans include peat depth maps for each of the bogs within the Application Site. The ecological survey report for both Ballivor and Carranstown bogs state that peat depths are predominantly in excess of 2.6m (Note that the report for Ballivor Bog states that only one third of the bog was surveyed). The ecological survey notes that the surface of Carranstown is covered in red or Sphagnum peat. Meanwhile the report for Bracklin states that the main peat type left is an acidic red peat with mixed gravel till exposed at several places. No additional information is supplied in the ecological reports for Lisclogher East or Lisclogher West.

A total of 102 no. trial pits have been completed across the Application Site as part of the site investigations for the proposed Ballivor Wind Farm (trial pit and boreholes investigations were carried out by FT and Irish Drilling Ltd (IDL) on 17th – 21st August 2020, 1st-16th February 2021, 19th July 2021 and 5th-11th August 2021; In addition, Bord na Móna undertook trial pitting on the 18th – 19th March 2021). Trial pit depths extended to a maximum of 6mbgl (metres below ground level). Peat was encountered in all trial pits (with the exception of those completed in the south of Bracklin Bog) with peat depths ranging from 0.1 to 4.9mbgl. Ground conditions generally consisted of peat overlying glacial tills comprising of slightly sandy gravelly silt/clay and/or silty sands and gravels with come cobbles and boulders. Trial pit logs are included in Appendix 7-1.

A total of 16 no. cable percussion boreholes and 5 no. rotary coreholes were also completed as part of the site investigations for the proposed Ballivor Wind Farm. Borehole depths ranged from 1.70 to

11mbgl. Ground conditions generally comprised of peat overlying glacial till overlying possible bedrock. Summary data for the boreholes are included in Appendix 7-2.

All site investigation locations (TPs, BHs and RCs) are shown on Figure 7-4 to Figure 7-6.

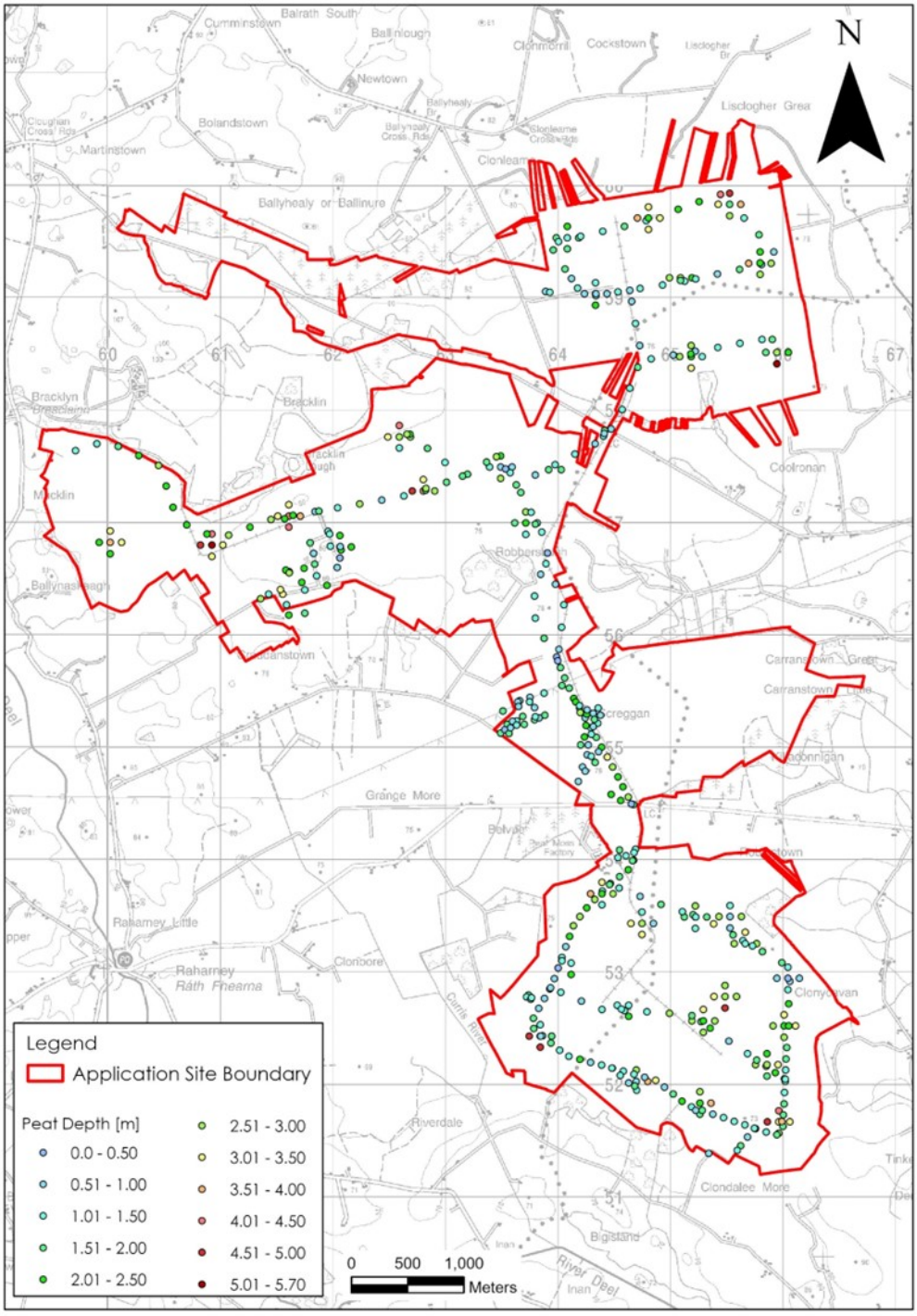


Figure 7-3: Recorded peat depths across the Application Site (HES, FT and MKO peat probes)

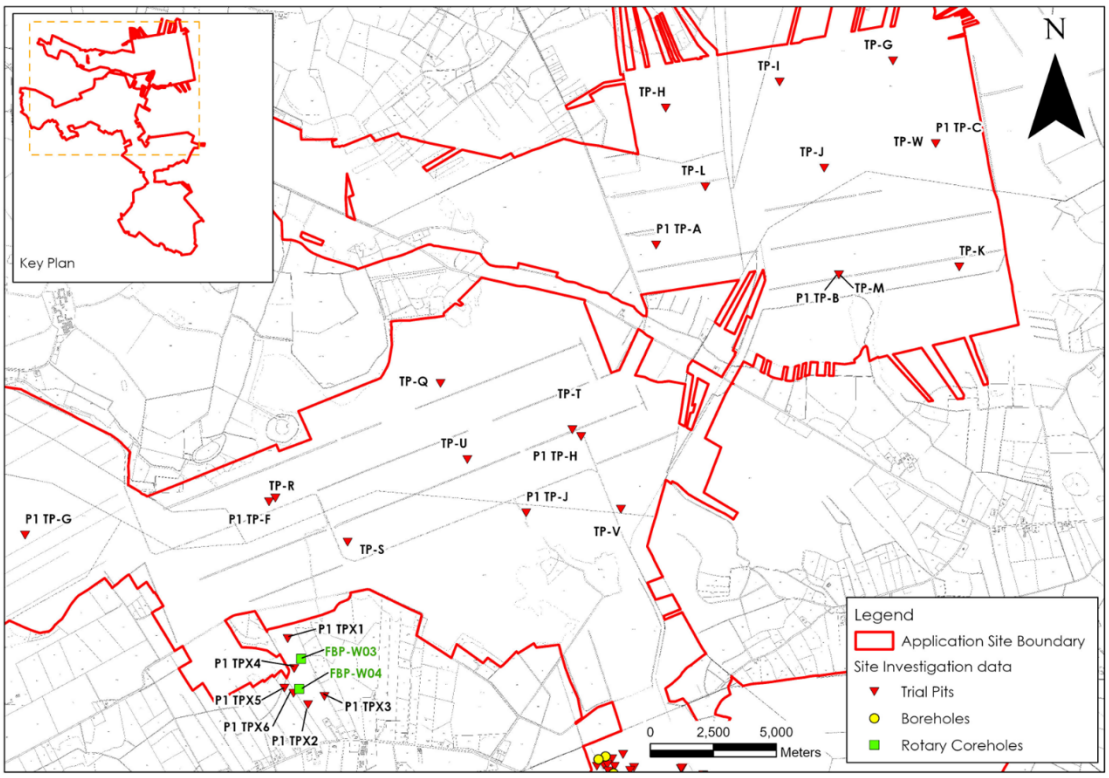


Figure 7-4: Site Investigation Locations (Trial Pits and Boreholes) in Bracklin and Lisclogher Bogs

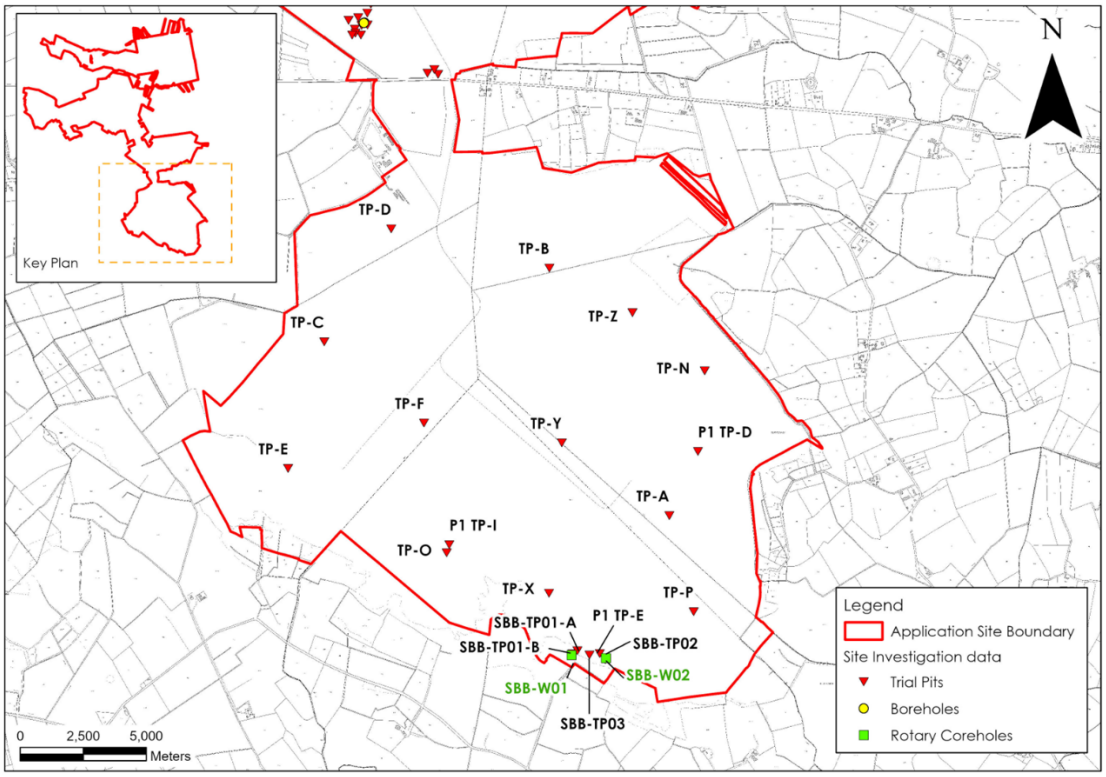


Figure 7-5: Site Investigation Locations (Trial Pits and Boreholes) in Ballivor Bog

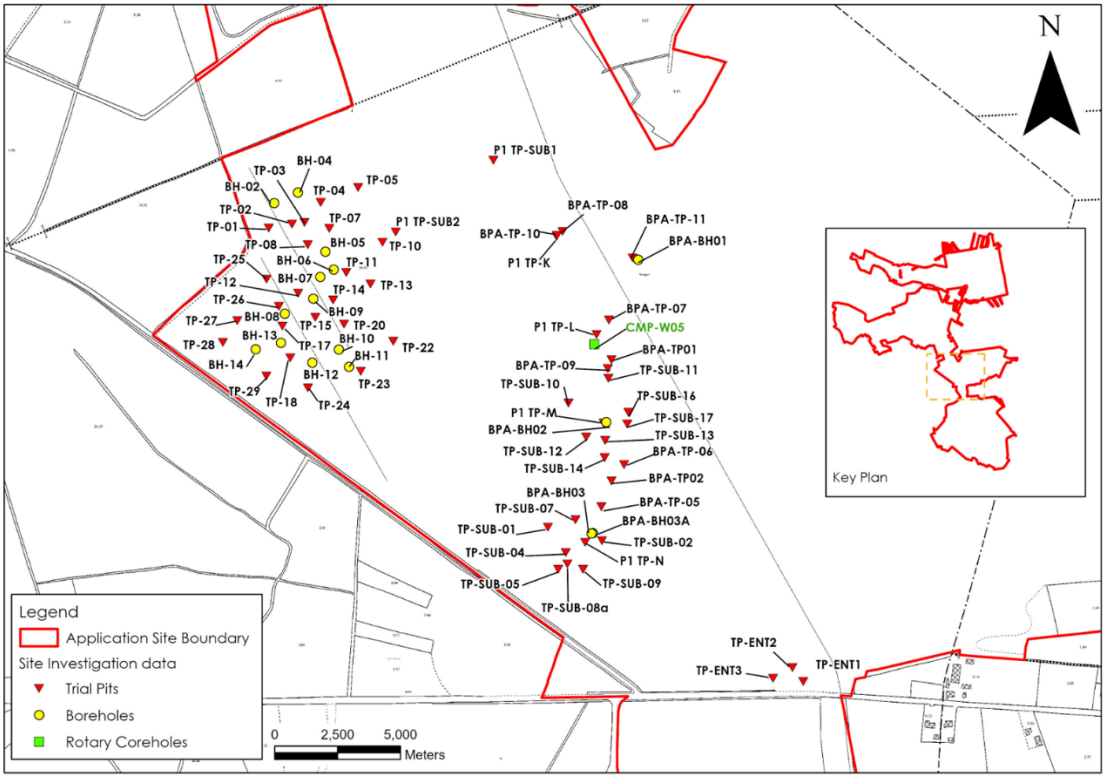


Figure 7-6: Site Investigation Locations (Trial Pits and Boreholes) in Carranstown Bog

7.3.4.2 Peat Extraction

Ballivor Bog was the first bog at the Application Site from which peat was extracted, with peat harvesting commencing in 1953. Peat extraction activities and all ancillary works commenced at the remaining bogs, with the exception of Lisclogher West, at various times and at various scales over the following decades as outlined in Section 7.3.3.1. Peat extraction activities and all ancillary works formally ended at the Application Site in the summer of 2020.

Annual sales figures and volumes of peat tonnage extracted have been provided by Bord na Móna for the period 1953 to June 2020 (Section 4.3.3 in Chapter 4) and July 1988 to June 2020 (Section 4.5.1.1 in Chapter 4).

The volumes of peat removed from the Application Site varied from year to year with a general and gradual increase (but weather dependent as seen by the fluctuations) with time as more of the Application Site became available for peat extraction activities and all ancillary works. As seen in Figure 7-7, peak peat extraction activities and all ancillary works occurred from the mid-1980s to the early 2000s. According to the Applicant's records the total volume of peat extracted from the Application Site during the Peat Extraction Phase was 4,027,213 tonnes. The greatest volume of peat produced in any given year was 117,755 tonnes, removed in 1989.

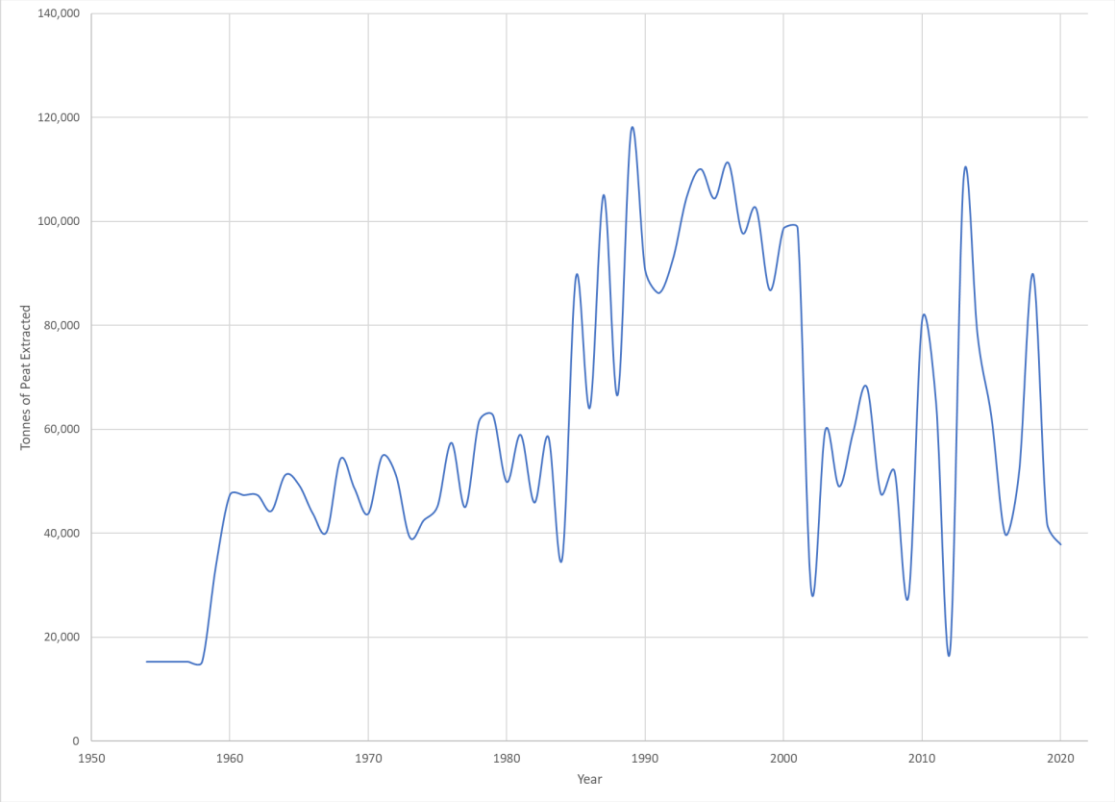


Figure 7-7: Peat Volume (tonnes) extracted from the Application Site (1954 – 2020)

7.3.4.2.1 Peat Extraction 1953-June 1988

Bord na Móna records indicate that approx. 1,626,398 tonnes (sod and milled) were extracted from the Ballivor Bog Group for the period 1953 – June 1988 inclusive. Peat extraction volumes are not available for 1953. On the basis that peat extraction activities and all ancillary works only commenced at the Application Site in 1953, it is assumed that the volumes generated were not significant and not comparable to the volumes generated in subsequent years.

Ballivor Bog was the only bog from which peat was being extracted up until 1957 when peat extraction activities and all ancillary works was initiated at Bracklin Bog. Lisclogher Bog followed quickly, with peat extraction activities and all ancillary works commencing in 1960.

Based on figures supplied by the Applicant relating to peat tonnage extracted (1953 – June 1988), Table 7-8 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 m^3/tonne was used to calculate volumes of peat removed.

During this time period (1953 to June 1988) ~1,951,677m^3 of peat was removed. The peat milling process involves the top 10-15mm of the peat extraction field surface being removed during any given harvests. In a typical year, a total of 12 no. harvests (weather dependent) would be completed, which would equate to 12 – 18cm of peat being removed each year. When this is applied to the 34-year period from 1953 – June 1988, it can be estimated that ~3.9 – 5.9m of peat was removed from any production field which was utilised throughout this period. However, it is unlikely that certain fields were utilised throughout this period and therefore the depth of peat removed is likely to be less than 4m.

Table 7-8: Peat Extraction Volumes from 1954 to 1987

Peat Extraction (First Year of Extraction)	Peat Weight 1954 - -1987 (Tonnes)	~Peat Volume (m^3)
Ballivor (1953) Bracklin (1957) Lisclogher (1960) Carranstown west (some date preceding 1988) Lisclogher West (extraction never commenced)	1,626,398	1,951,677

7.3.4.2.2 Peat Extraction July 1988 – June 2020

Bord na Móna records indicate that approx. 2,400,815 tonnes (sod and milled) were extracted from the Ballivor Bog Group for the period July 1988- June 2020 inclusive.

As outlined in Chapter 4 and Section 7.3.3.1, Ballivor Bog remained in production until 2020. Sod peat extraction ceased at Bracklin Bog in 2003; however, Bracklin West has been used for milled peat extraction from around 1995 until 2020. In the west of Carranstown Bog, the first peat extraction activities and all ancillary works had been initiated by 1988, while peat extraction had begun prior to 1995 in the eastern portion and continued until 2020. Milled peat extraction continued at Lisclogher until 2003.

Based on figures supplied by Bord na Móna relating to peat tonnage extracted (July 1988 – June 2020), Table 7-9 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 m^3/tonne was used to calculate volumes of peat removed.

During this time period, the greatest volume of peat removed in any given year occurred in 1989 when ~141,306m^3 of peat was removed.

As stated above, in a typical year with suitable weather conditions, ~12 – 18cm of peat would be removed during milled peat extraction. When this is applied to the 32-year period from July 1988 – June 2020, it can be estimated that ~3.8 – 5.7m of peat was removed from any production field which was utilised throughout this period. However, it is unlikely that certain fields were utilised throughout this period and therefore the depth of peat removed is likely to be less than 4m.

Table 7-9: Peat Extraction Volumes from 1988 to 2020

Peat Extraction Bogs (Years)	Peat Weight July 1988 – June 2020 (Tonnes)	~Peat Volume (m^3)
Ballivor (1988 - 2020) Bracklin (1988 – 1990s Bracklin West (~1995 – 2020)) Lisclogher (1988 - ~2000) Carranstown (1988 - 2020)	2,400,815	2,880,975

7.3.5 Bedrock Geology

The GSI map the bedrock underlying the Application Site to be Dinantian Pure Unbedded Limestones (DPUL) of the Waulsortian Limestone Formation, Dinantian Upper Impure Limestones (DUIL) of the Tober Colleen Formation and the Lucan Formation and Dinantian Lower Impure Limestones (DLIL) of the Ballysteen Formation.

The Waulsortian Limestone Formation underlies the vast majority of Ballivor Bog, all of Carranstown Bog, the southern section of Bracklin Bog and the east of Lisclogher Bog and the west of Lisclogher West. The Waulsortian Limestone Formation comprises massive, unbedded lime mudstones and are dominantly pale-grey in colour. The Tober Colleen Formation underlies the central area of Bracklin Bog and section in the centre of Lisclogher Bog and in the west of Lisclogher West. the Tober Colleen formation is described by the GSI as dark-grey, calcareous, commonly bioturbated mudstones and subordinate thin micritic limestones. The Lucan Formation underlies an area to the southwest of Ballivor Bog, and the east of Lisclogher West and the west of Lisclogher Bog. The Lucan Formation is noted to comprise of dark limestones and shales. The Ballysteen Formation underlies the western portion of Bracklin Bog and is comprised of irregularly bedded and nodular bedded argillaceous bioclastic limestones, interbedded with fossiliferous calcareous shales.

The Application Site is crosscut by several northeast – southwest orientated faults. 2 no. faults of this orientation are mapped to underlie Ballivor Bog with a third mapped in the southeast of Carranstown Bog. A large fault of similar orientation is also mapped to cut across Lisclogher and Bracklin bogs. This fault is in turn crosscut by a later north/northwest to south/southeast orientated fault which underlies the west of Bracklin Bog and the western section of Lisclogher West.

There is no record on GSI mapping of any bedrock outcrop within the Application Site or in the surrounding lands.

No bedrock was encountered in any of the trial pits completed at the Application Site which extended to a maximum depth of 4.9mbgl. The 16 no. cable percussion boreholes and 5 no. rotary coreholes extended to depths ranging from 1.7 to 11mbgl and were terminated due to obstruction (possibly due to bedrock or large boulders in the underlying glacial till) (Appendix 7-II). Depth to bedrock at the Application Site is expected to be in excess of 5m across the site due to the thickness of subsoil peat.

A bedrock geology map of the area is attached as Figure 7-8.

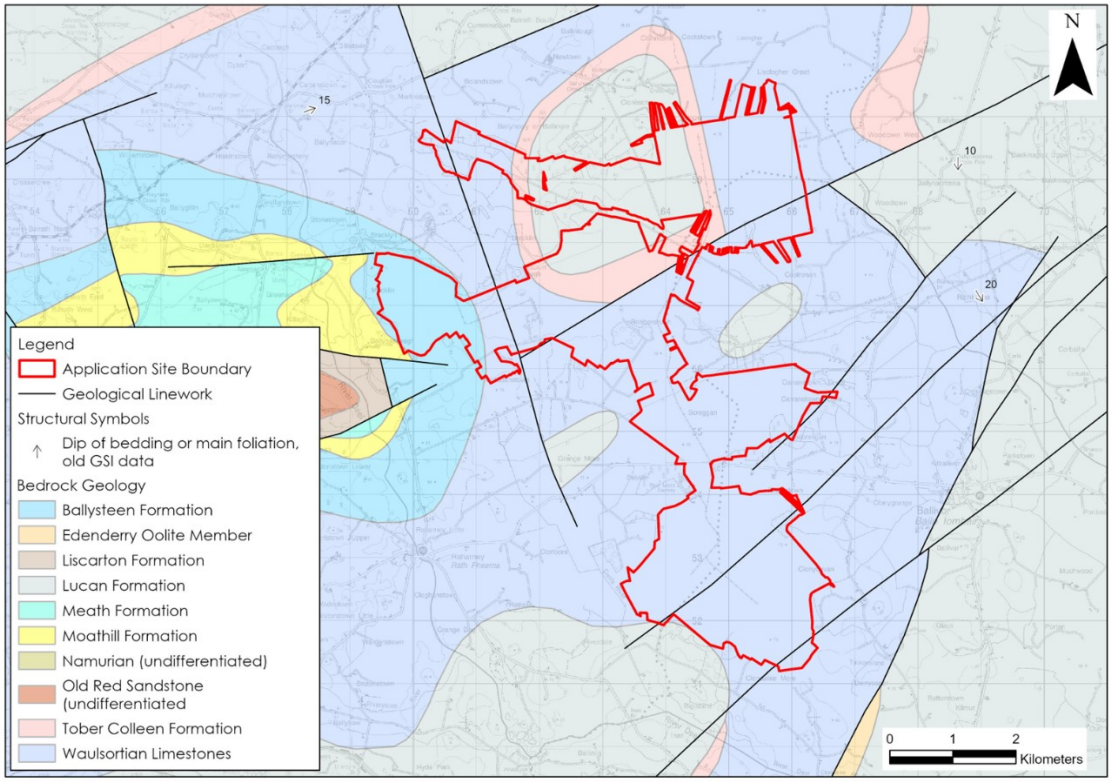


Figure 7-8: Bedrock Geology map

7.3.6 Soil Contamination

According to the EPA online mapping (www.epa.ie), there are no licenced waste facilities or dump sites within the Application Site or its immediate environs. The closest EPA mapped waste locality is Annaskinnan Landfill located approximately 5.6km southwest of Ballivor Bog.

The EPA map several Industrial Emissions Licensing (IEL) facilities and IPC facilities in the vicinity of the Application Site. An IPC Licence (P0501-01) was granted to the Applicant on 28/04/2000 for the extraction of peat at the Ballivor Bog Group. Condition 7 referred to Waste Management whereby all hazardous waste materials (oils, oil filters, batteries etc) were required to be disposed of by licenced waste contractors.

An IEL licence (P0984) also exists at Clondrisse Pig Farm located ~600m north of Bracklin Bog.

There is no record on GSI mapping of the presence of any historic quarries or pits within the Application Site. Several historic quarries dating from the 1830s are mapped along the R156 to the east of the Application Site and in the lands surrounding the village of Ballivor. The GSI also record a quarry dating from the early to mid-20th century to the west of the existing Bord na Móna depot situated to the north of Ballivor Bog, located ~90m from the Application Site boundary. Historic gravel pits and quarries are also recorded ~300m southeast of Ballivor Bog, ~50m south of Bracklin Bog and ~800m southeast of Lisclogher Bog.

During the site walkover surveys completed as part of the site investigations for the proposed Ballivor Wind Farm, no areas of particular contamination concern were identified within the Application Site. Some minor fly-tipping was noted along the edge of access tracks.

7.3.7 Economic Geology

The GSI Online Minerals Database accessed via the Public Data Viewer (www.gsi.ie) shows a small number of historic quarries and pits in the lands surrounding the Application Site as described above in Section 7.3.6. The GSI does not record the presence of any active quarries or pits in the Application Site or in the surrounding lands. The closest mapped active quarry is located approximately 10km east of the Application Site near the village of Rathmoylan. The closest GSI mapped active sand and gravel pit is located approximately 8km south of the site near Clonard.

The GSI also record the presence of 1 no. mineral locality within the Application Site. This is located in Lisclogher Bog with the key mineral identified being marl. In the townland of Riverdale to the southwest of Ballivor Bog the GSI note the occurrence of sand and gravel deposits describing the site as an active pit with high quality sand.

The GSI online Aggregate Potential Mapping Database (www.gsi.ie) shows that the crushed rock aggregate potential of the Application Site ranges from Low to Very High. The areas of very high potential are located in the centre of Carranstown and Bracklin bogs. 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. Refer to

Table 7-1 for definition of these criteria.

Table 7-10: Summary of Bedrock Geology and Geological Resources

Bog Name	Bedrock Geology	Geological Resource Potential
Ballivor	Calcareous, with bog mainly underlain by Waulsortian Limestone. Faulting in the area has a NW-SE orientation.	Low to Medium
Carranstown	Calcareous, with bog mainly underlain by Waulsortian Limestone. Faulting in the area has a NE-SW orientation	Low to Medium
Bracklin	Calcareous, with bog underlain by Waulsortian Limestone to south, and Tober Colleen Formation and Lucan Formation to north. Faulting in the area has NW-SE and NE-SW orientations	Low to Medium
Lisclogher	Calcareous, with bog underlain by Waulsortian Limestone to east, and Tober Colleen Formation and Lucan Formation to west. Faulting in the area has a NE-SW orientation	Low to Medium
Lisclogher West	Calcareous, with bog underlain by Waulsortian Limestone to west, and Tober Colleen Formation and Lucan Formation to east. Faulting in the area has a NW-SE orientation	Low to Medium

7.3.8 Geological Heritage Sites

There are no geological heritage sites near the Application Site (www.gsi.ie). The closest geological heritage site, the Ballycor Mushroom Rocks (Site Code: WH001) is located approximately 7km west of the Bracklin Bog.

A map of local geological heritage sites is attached as Figure 7-9.

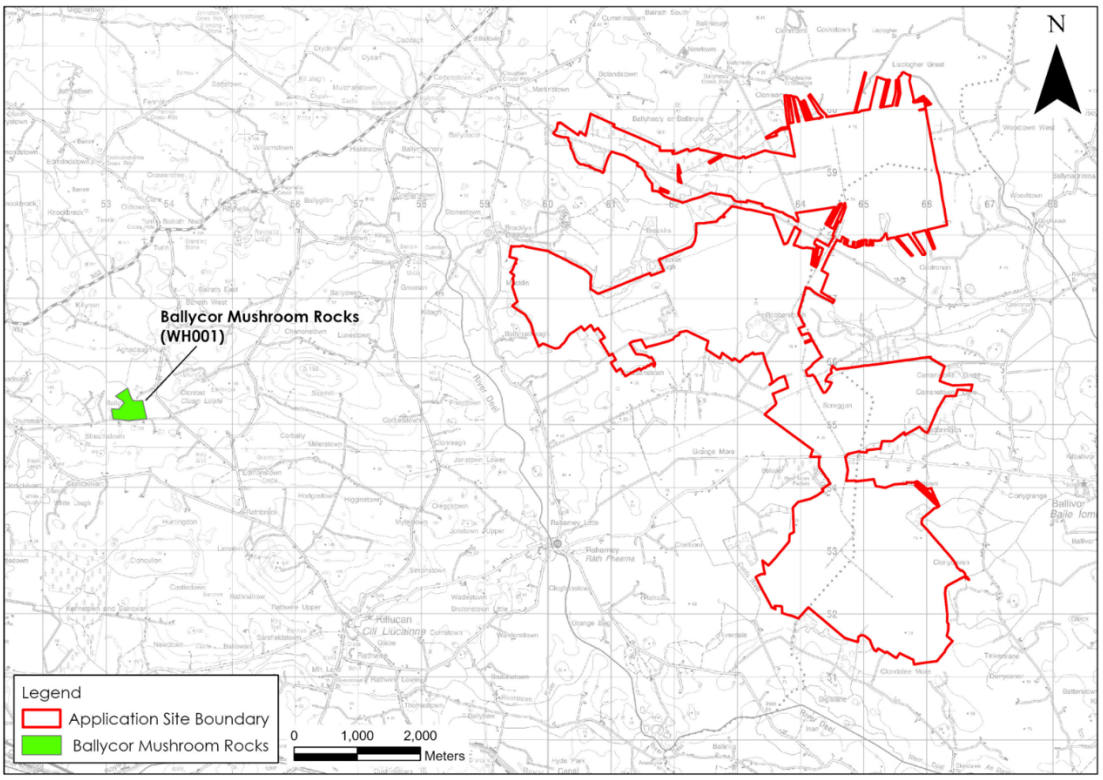


Figure 7-9: Geological Heritage Areas

7.3.9 Peat 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 lands. The closest landslide event recorded by the GSI occurred in 1999, and is mapped at Girley Bog, Chamberlainstown, approximately 10km northeast of Lisclogher Bog.

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring at this site as **Low**. This is due to the sites lowland setting and flat topography. Peat failures and landslides are more likely to occur in upland setting where there is sloping ground and high rainfall rates.

A qualitative assessment of geohazards at each of the 5 no. bogs has been completed and is presented in Table 7-11. 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. We note that all of the bogs are drained, and peat extraction activities and all ancillary works has now ceased. All 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.

Table 7-11: Summary of Geohazards

Bog Name	Local Geohazards	Ground Slopes (°) (5%ile/80%ile)	Average Residual Peat Depths (m)	Slope Failure Risks
Ballivor	None recorded	0 / 8.11	2.55	Negligible
Carranstown	None recorded	0 / 11.1	1.94	Negligible
Bracklin	None recorded	0 / 11.21	3.02	Negligible
Lisclogher	None recorded	0 / 7.43	2.57	Negligible
Lisclogher West	None recorded	0 / 10.18	Unknown	Negligible

7.4 Characteristics of the Development

7.4.1 Peat Extraction Phase (July 1988 – June 2020)

A full description of the development and all works completed at the Application Site post-dating July 1988 is provided in Chapter 4.

By 1988, peat extraction activities and all ancillary works were well established at Ballivor, Carranstown, Bracklin, and Lisclogher. By this time drainage had already been inserted and railway infrastructure had been laid on all bogs with the exception of Lisclogher West.

Lisclogher West itself was drained between 1988 and 1995, with 6 no. silt ponds and 6 no. surface water emission points inserted into the bog. However, peat was never extracted from Lisclogher West.

Elsewhere across the Application Site peat extraction activities and all ancillary works continued at different times and at different levels of intensity from July 1988 to June 2020. In addition, some bog rehabilitation works including drain blocking have been undertaken at Carranstown bog during this period. A total of 2,880,975m^3 of peat has been extracted from the Application Site since 1988. Peat has been extracted using two different methods, milled and sod, outlined briefly below and described fully in Chapter 4. In general, milled peat is extracted from deep peat layers while sod moss extraction occurs at the bog margins and from the upper peat layers.

During this time period milled peat extraction occurred at Ballivor, Carranstown, Bracklin and Lisclogher bogs. Records indicate that the Derrygreenagh Bog Group, of which the Ballivor Bog Group and thus the Application Site is a subset, supplied peat to the Rhode ESB Power Station, Croghan Briquette Factory, Kilberry and Cúil na Móna when required. Information regarding which bogs supplied which specific end user, quantities of supply, frequency of travel and travel routes are not available. From 1985, peat from the Application Site was also distributed in bulk from the peat loading facility at Ballivor Works to the horticulture industry overseas via Dublin Por. Milled peat extraction requires good solar drying condition and can occur anytime from April onwards once suitable drying conditions are present. There are 4 no. stages involved in the process of milled peat extraction outlined below:

1. **Milling** - During the milling process the top 10-15 mm of the surface of each field was broken into peat crumbs by powered milling drums towed behind agricultural tractors. This layer of crumbed or milled peat is called a crop and has a moisture content of about 80% when milled.

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

As part of the development of the bogs for milled peat extraction, parallel surface water drains were created at intervals of 15m, with the section of bog between the drains referred to as production fields. The fields are slightly convex to facilitate runoff and to prevent surface water ponding. The drains fall towards the headland, located at the ends of the production fields. The drains are piped across the headland, allowing machinery to pass from one field to the next. The drainage network then continues to a series of silt ponds prior to discharging to a local watercourse. By 1988, milled drainage had already been implemented across much of the Application Site with the exception of Lisclogher West.

Meanwhile sod moss extraction was undertaken by the Applicant at both Lisclogher and Ballivor bogs during this period. In addition to these, third party sod peat extraction activities and all ancillary works has occurred at Lisclogher Bog from the 1990s until 2020. Sod moss is the term used to describe peat produced in block form for horticultural use. The sod moss is extracted mechanically with specially equipped excavators. The sods are cut from mini face-banks or the margins of trenches that are gradually widened and left on the bog to dry for approximately 12 months, reducing moisture content from 90% to 50% - 60%. Once the required moisture content is reached the sod moss is stockpiled at the edge of bog prior to transportation for processing. One layer is typically cut at a time until the horticultural peat is exhausted.

The peat extraction activities and all ancillary works areas were served by a railway line which was moved around the Application Site as different areas came in and out of production. During this period several buildings and other infrastructures were constructed at the Application Site to support peat harvesting operations. These included a Welfare Centre constructed in the townland of Grange More (1988), an extension to the pre-existing storage facilities (1990) and the construction of an ESB sub-station (2005). These developments supported the existing processing plant, loading bay and workshop located at the Ballivor Works. In addition to these, grants for the laying of 2 no. grass strips (2013) and the erection of a guyed wind monitoring mast (2015/2016) were also received at the Application Site.

In terms of environmental monitoring, control and monitoring measures have been implemented at the site since April 2000. Please refer to Chapter 4 and Appendix 4-1 for full details.

7.4.2 Current Phase (June 2020 – Present Day)

The Current Phase of the Project includes all activities carried out at the Application Site from the cessation of peat extraction activities and all ancillary works in the June of 2020 to the present day.

During this period, activities at the Application Site have been limited to the removal of stockpiled peat with no peat extraction activities or ancillary works occurring. From mid-2020 to mid-2021 the

operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

The drainage infrastructure, silt ponds and surface water discharge locations continue to be in operation and to be maintained as per the IPC Licence requirements. The silt ponds are maintained in accordance with Condition 6 of the IPC Licence, which states that all drainage from boglands is discharged via appropriately designed silt ponds which are desilted twice a year. The silt arising from these operations is either stockpiled a safe distance from drainage features or spread onto production fields.

Environmental monitoring continued during the Current Phase of the Project in accordance with IPC licence conditions.

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures, which is in addition to the IPC licence requirement (does not form part of this substitute consent application) and is being is being applied at specific locations across the Applicant's landbank that are identified as suitable for the prescribed enhancement measures. PCAS measures to rewet peat including intensive and targeted drain blocking have commenced in Carranstown East, Lisclogher West and Bracklin West (refer to Chapter 4 Section 4.8.2 for further details in relation to PCAS) during the Current phase of the Project.

7.4.3 Remedial Phase

It is currently proposed to implement rehabilitation plans at each of the bogs comprising the Application Site. Rehabilitation has already commenced on a section of Carranstown Bog. These rehabilitation plans are required in order to fulfil the requirements of Condition 10.2 of the IPC Licence No. P0501. Each Cutaway Bog Decommissioning and Rehabilitation Plan, as per Condition 10 of the IPC Licence will be subject to agreement with the EPA. To date, Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan and Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan have been approved by the EPA, Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan, Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan, and Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan will be reviewed with the EPA and approved by same prior to their implementation.

The objective of the rehabilitation plans is to stabilise and rehabilitate the peat bog within the Application Site. The plans use bespoke interventions designed to firstly stabilise the environment and secondly to rehabilitate the site as much as possible by placing the existing peatland environments on a path towards naturally functioning peatlands.

The proposed cutaway bog decommissioning and rehabilitation plans at the Application Site will be undertaken using standard best practices (refer to Appendix III of the Cutaway Bog Decommissioning and Rehabilitation Plans included as Appendix 4-2).

Each individual bog comprising the Application Site has its own unique history of peat extraction activities and all ancillary works operations, therefore the most appropriate rehabilitation approach is bog-specific reflecting local ecological and hydrological factors. For example, the rehabilitation of the milled peat extraction area in Bracklin West will be different to that of Lisclogher West, from which peat was never extracted. Consequently, each bog has its own exclusive Cutaway Bog

Decommissioning and Rehabilitation Plan. The key intervention to be applied is the rewetting of the bogs through measures such as drain blocking. This will encourage natural colonisation of cutaway areas and will establish a more suitable hydrological/hydrogeological regime for the development of bog habitats.

The rehabilitation plans comprise short-term planning actions, short-term practical actions and long-term actions. The initial short-term planning actions will involve seeking approval of the rehab plans from the EPA. In addition, detailed site plans of how the various rehabilitation measures will be applied will be developed for each bog and a review of all issues and constraints which may impact how the proposed rehabilitation plans will be completed. The short-term planning actions will also ensure that all activities associated with the rehab plans will be completed in accordance with the requirements of the IPC Licence. Several short-term actions will be completed in the first 2 years following EPA approval of the rehab plans. These actions will include intensive drain blocking and monitoring of the rehabilitation measures. Silt ponds will continue to function during this phase. Longer term actions (>3 years) include the evaluation of the success of the short-term rehabilitation measures and undertake further remediation where necessary. Long-term monitoring, aftercare and maintenance will be completed until the IPC Licence is surrendered. We understand that during this phase of the rehab plans, silt ponds will be assessed and decommissioned if necessary.

Much of the work associated with the rehabilitation plans will occur during the initial stages of the plan. Once drain blocking and other measures have been implemented the operational activities will comprise non-intrusive ecological and hydrological monitoring and may also include minimal maintenance and repair works.

7.5 Assessment of Significant Effects and Control/Mitigation Measures

7.5.1 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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently. other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to

natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the "do nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

7.5.2 Identification of Impacts

7.5.2.1 Peat Extraction Phase (July 1988 – June 2020)

The Peat Extraction Phase of the Project includes all works undertaken from July 1988 to the cessation of peat extraction activities and all ancillary works in June 2020.

7.5.2.1.1 *Soils/land (Land take)*

Changes to soils/land have been investigated at the Application Site between July 1988 and June 2020 (refer to Section 7.3.3). Due to the nature of peat extraction activities and all ancillary works, the primary land change occurs during the initial site preparation works where drainage is installed and the removal of vegetation in preparation for peat extraction activities and all ancillary works. Peat extraction activities and all ancillary works had replaced (land take) a vast expanse of raised bog at the Application Site with large areas of drained bare peat fields by 1988. The greatest effect of the peat extraction activities and all ancillary works on soils/land would have occurred during the original drainage and removal of vegetation. During these site preparation works the individual bog areas would have experienced a relatively abrupt change in land cover from raised bog prior to drainage to bare

peat fields. Therefore, the greatest land take associated with the peat extraction activities and all ancillary works at the Application Site predated 1988.

However, by 1988 industrial peat extraction activities and all ancillary works was already well established across much of the Application Site. Ballivor Bog was drained in 1948, with peat extraction activities and all ancillary works beginning in 1953. Site preparation works were commenced at Bracklin Bog in 1950, with peat extraction activities and all ancillary works commencing in 1960 on the southern area. Western Carranstown had also been drained and stripped of vegetation between 1974 and 1987, with peat extraction activities and all ancillary works commencing prior to 1988. Eastern Carranstown had been drained only by 1988, with vegetation clearance occurring between 1989 and 1995. Peat extraction activities and all ancillary works had commenced at Lisclogher Bog, prior to 1988, in 1960. Therefore, by 1988 the soils/land at these bogs had already been significantly altered and ancillary structures already in place. In 1988 these areas would have comprised of industrial peat extraction activities and all ancillary works with landcover consisting of drained bare or vegetated peat fields separated by field drains. Any changes in soils/land which post-date the initial drainage and removal of vegetation would have been imperceptible in comparison to the original changes which predate 1988. Slight annual topographic changes (~0.1-0.2m/year) associated with peat extraction activities and all ancillary works will have occurred in the extraction areas at Ballivor, Bracklin, Carranstown and Lisclogher bogs.

In contrast, Lisclogher West remained largely as remnant undeveloped bog in 1988, with the installation of drainage having commenced in 1973, and having been completed by 1995. Significant changes to land would have occurred here when this bog was drained however the change would have been consistent with the emerging trend established by the wider peat extraction activity. Peat extraction activities and all ancillary works first occurred at eastern Carranstown and the northwestern portion of Bracklin by 1995 and any subsequent changes to land would have been limited to slight annual topographic changes associated with peat extraction activities and all ancillary works. Peat was never extracted from Lisclogher West and therefore that bog would have experienced no changes to soils/land subsequent to drainage and the associated loss of vegetation and ground subsidence.

Pathway: Drainage, removal of acrotelm, removal of vegetative surface and extraction of peat.

Receptor: Soils/land.

Impact Assessment: The soils/land changes have been established through past extraction works and associated activities.

Control Measures: No known control measures for land and soils/land exist in the context of the activity being assessed here, other than working on the Applicant's owned land, and implementing peat extraction activities and all ancillary works in an established operational system.

7.5.2.1.2 *Peat Extraction - Land*

Based on peat extraction activities and all ancillary works figures supplied by the Applicant and historical landuse records, all bogs comprising the Application Site, with the exception of Lisclogher West, have been subject to peat extraction activities and all ancillary works at some stage between July 1988 and June 2020.

The peat extraction activities and all ancillary works operations were undertaken at different times and at different levels of intensity throughout the Application Site. The total volume of peat removed at the site from July 1988 to June 2020 is estimated to 2,400,815 tonnes (2,880,975m^3 with an average of 91,267m^3 extracted per year).

During an average year of milled peat extraction ~12 – 18cm of peat has been removed from the peat extraction fields. This equates to ~3.8 – 5.7m of peat during the Peat Extraction Phase. This is likely to be an overestimate as no production field would have remained in production for the entire Peat

Extraction Phase (i.e. certain production fields would have been bypassed at different times and for various reasons). Furthermore, certain years would have had lower yields due to poor weather conditions.

Pathway: Extraction/excavation.

Receptor: Peat and peat subsoils.

Control Measures:

Pre-IPC Licence

As detailed in Section 4.3.5 in Chapter 4 of this rEIAR, with the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.9 in Chapter 4), formal documentation outlining dedicated measures referred to as control measures practised on site from 1948 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the 1999 IPC Licence application.

Due to the nature of the operations ongoing at the site, there were no control measures to prevent or minimise the removal of peat from the site. Best practice procedures and control measures have been implemented to both protect peat from contamination (see Section 7.5.2.1.3) and from erosion by air and water.

The following management measures were implemented for peat sediment control/dust suppression:

- Stockpiles were compacted on either side by large rollers drawn by 65H.P tractors;
- Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
- Avoid extraction during windy weather;
- Keep headlands clean- remove loose peat;
- Drive slow along dusty headlands; and,
- Clean road crossing.

At this time Bord na Móna were also implementing several control measures in order to minimise the impact of peat extraction activities and all ancillary works on surface water quality including:

- Internal drains cleaned on a regular basis in suitable weather. This was completed to remove sludge from the bottom of ditches, allowing them to retain full functionality. The sludge was disposed of by spreading it on the adjacent production fields.
- Drain maintenance was carried out using draglines and excavators, ensuring that these drains were fit for purpose.
- Drain maintenance was carried out mainly prior to and post the harvesting season.
- Visual inspection of surface water pumps daily;
- Operational check of surface water pumps biweekly; and,
- Service of surface water pumps monthly
- Silt ponds were utilised to control the amount of sediment being discharged at outfalls. At this time, silt ponds were designed for an upper limit of 100mg/l suspended sediment.
- Silt ponds were upgraded in the 1990s to cater for the settling of sufficient amount of silt. This often included the construction of a second silt pond adjacent to the first, which was used as a backup and to facilitate desludging of the primary pond.
- Silt ponds were de-sludged twice per annum.

Active IPC Licence

With the implementation of the IPC Licence in 2000, the control measures implemented previously by the Applicant were updated and expanded to include:

- The avoidance of harvesting during windy weather;
- Headlands are kept clean and free of loose peat;
- The covering of stockpiles with polythene film gauge sheets;
- Drains are protected and maintained free of excessive peat;
- Machinery do not drag loose peat into drains;
- Outfalls are controlled to minimise silt discharge; and,
- The avoidance of excavation during windy weather.

These control measures specifically pertain to preventing the erosion of exposed peat by both wind and water and therefore aim to protect both air and water quality (refer to Chapter 5, Chapter 8, and Chapter 9 for full details).

7.5.2.1.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

Accidental spillage during refuelling of machinery and plant (static and mobile) with petroleum hydrocarbons was 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. Hydrocarbon has a 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.

Discharges from wastewater systems (septic tanks) at office buildings, and at welfare facilities and workshops could potentially have caused surface water and groundwater contamination. Activities and features associated with peat extraction activities and all ancillary works include railway lines, machine passes, canteen structures, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks, peat loading facilities, and end user sites. These potential impacts existed at the Application Site and the welfare facilities and workshops. However, we understand from review of available Annual Environmental Reports submitted to the EPA under the IPC Licence, no significant pollution events/spills to groundwater have occurred since 2000 (surface water is dealt with separately in this rEIAR). We also deduce that there were no significant peat contamination issues arising prior to 2000 as these would have been mentioned and assessed in the EPA licence Application documentation and we could find no records of such occurrences.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Control Measures:

Pre-IPC Licence

As detailed in Section 4.3.5 in Chapter 4 of this rEIAR, with the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.9 in Chapter 4), formal documentation outlining dedicated measures referred to as control measures practised on site from 1948 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the 1999 IPC Licence application. 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 Application Site:

- All peat harvesting machinery were stored at the Ballivor Works at the end of each workday.

- All machinery were regularly inspected, serviced.
- All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components.
- A self-contained machine parts washer was located at the Workshop.
- All refuelling and vehicles maintenance was undertaken at the Ballivor 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 Ballivor Works.

Active 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.

7.5.2.1.4 Peat Stability

Peat instability or failure refers to a significant mass movement of a body of peat that would have a negative effect on individual bogs and potentially the surrounding environment. Peat instability could have occurred during development of bog drainage or ancillary activities associated with peat extraction activities and all ancillary works, including e.g. railway lines, machine passes, canteen structures, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks, peat loading facilities, and end user sites. The significant effects of peat failure at the Application 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.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Control Measures:

Generally, the only recorded landslides which relate to peat instability on raised bogs have occurred during the initial stages of bog drainage. The GSI or Bord na Móna records do not document the occurrence of any peat slides within the Application Site. All bogs have active and extensive drainage systems. The residual peat depths across much of the Application Site shallow, and slopes are small, so the risk of large-scale peat failure is negligible. 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 systems around the 5 bog units were maintained and managed by Bord na Móna throughout the duration of the Peat Extraction Phase (1988 – 2020); 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).

7.5.2.1.5 Construction of Supporting Infrastructures and Buildings

From July 1988 to June 2020, activities at the Application Site were not solely limited to peat extraction activities and all ancillary works. During this time period several supporting infrastructures and facilities were constructed to aid the peat extraction activities and all ancillary works operations. These works included the construction of a Welfare Centre (108m^2) in the townland of Grange More (1988), an extension to the pre-existing storage facilities (1990) (510m^2), construction of an ESB sub-station (2005) (23.15m^2) and two grass air strips for model aircraft (2013). In addition, a guyed wind monitoring mast (2015/2016) was erected in Lisclogher Bog for the purpose of assessing the site for a potential future wind energy development. Please note that all of these developments were consented (refer to Chapter 2) and are assessed here for completion due to their association with and/or proximity to the peat extraction activities and all ancillary works at the Application Site.

However, these developments had a very small footprint in the context of the entire Application Site. Additionally, the construction of these infrastructure would have been completed over a relatively short time. Therefore, the potential for these developments to impact on land, soils/land, soils, subsoils and bedrock is much reduced when compared with the potential impacts associated with the peat extraction

activities and all ancillary works which were ongoing during this time period (Section 7.5.2.1.1 to Section 7.5.2.1.4).

Pathway: Excavation of soils/subsoils, infiltration of contaminants through pore space in peat, subsoil and bedrock.

Receptor: Land, soils/land, peat, peat subsoils and bedrock.

Control Measures:

Bord na Móna received planning permission for the above developments and all developments were constructed in accordance with the conditions set out in their respective permissions. For example, the conditions attached to the planning permission for the ESB substation pertain to ensuring the development is constructed in accordance with ESB standards and as per the plans and particulars submitted.

7.5.2.2 Current Phase (2020 – Present)

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction activities and all ancillary works at the Application Site in the June 2020 to the present day.

7.5.2.2.1 *Land and Soils/land*

Following the cessation of peat extraction activities and all ancillary works in June 2020, landuse at the Application Site is no longer classified as commercial peat extraction. The land that was in active peat extraction up to that time (~220 ha) are now available for re-vegetation and natural colonisation. However, given the relatively short time period which has elapsed since the conclusion of peat harvesting operations, 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.

Pathway: Extraction of peat and drainage works.

Receptor: Land and Soils/land.

Impact Assessment: Any works during this time period have been completed under licence from the EPA and Bord na Móna's Environmental Management System.

The area of land owned by Bord na Móna remains the same.

Control Measures: No specific control measures.

7.5.2.2.2 *Peat Extraction*

No peat extraction has occurred at the Application Site since the cessation of the Applicants peat extraction activities and all ancillary works in June 2020. Stockpiled peat was removed from the Application Site by the end of 2023.

Therefore, no significant change has occurred in terms of peat depths etc. during this post extraction phase of the Project.

Pathway: Extraction/excavation.

Receptor: Peat.

Control Measures: No control measures were required as peat was not excavated from the Application Site during the Current Phase. The measures outlined in Section 7.5.2.1.2 to prevent the erosion of peat continue to be in operation in accordance with IPC Licence conditions.

7.5.2.2.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

Despite the cessation of peat extraction activities and all ancillary works at the Application Site, there is still some very limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Applicants 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 7.5.2.1.3 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Control Measures:
Measures that mitigated against contamination of peat, subsoil and bedrock are outlined in Section 7.5.2.1.3 and are currently being adhered to at the Application Site. These control measures significantly decrease the risk of soil contamination. These measures/controls have been implemented as part of compliance with IPC licence conditions across the Application Site. No further control measures, 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.

7.5.2.2.4 *Peat Stability*

No peat extraction has occurred since the cessation of the Applicant's peat extraction activities and all ancillary works in June 2020. Therefore, no significant change in topography and/or drainage has occurred during the period. Please note that some rehabilitation works including drain blocking have been undertaken at Carranstown Bog, Lisclogher West, and western Bracklin during this period (as part of PCAS, refer to Chapter 4 Section 4.8.2). However this would have no impact on local peat stability due to the low-lying nature of these areas.

The risk of peat failure at the Application Site remained very low with no change observed from Section 7.5.2.1.4.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Control Measures/Monitoring: No further mitigation, beyond that implemented and outlined in Section 7.5.2.1.4 are deemed necessary.

7.5.2.3 Remedial Phase

This section presents an assessment of likely significant effects resulting from the Applicant's proposed rehabilitation plans for the 5 no. bogs comprising the Application Site on the land, soils and geological environment.

7.5.2.3.1 *Soils/Land*

The overall aim of the rehabilitation plans is to put the bogs on a trajectory towards becoming naturally functioning peatlands. One of the main criteria which will be used to define the success of the rehabilitation plans will be the stabilisation of the former peat extraction activities and all ancillary works areas.

Natural colonisation is likely to form the basis for stabilisation of the current bare peat fields. Former peat extraction activities and all ancillary works areas across the Application Site have already re-vegetated naturally so it would be expected that the current bare peat fields present today would develop in a similar manner. Bord na Móna's rehabilitation plans identify two scenarios present at the Application Site which will determine any additional targeted revegetation or rewetting measures to be implemented. Firstly, in the case that significant acid peat remains at the surface there will be an assessment of the area to block drains and promote re-establishment of more typical bog communities. Secondly where alkaline peat is exposed at the surface the land is likely to revert to more alkaline poor fen/wetland or Birch dominated scrub areas.

Both of these scenarios will result in a positive change in land and soils/land across the Application Site. Land cover will change from bare peat fields to an array of scrub, woodland, wetland and peatland communities. However, the Application Site is unlikely to ever revert to the original raised bog which existed prior to the commencement of peat harvesting operations.

Pathway: Natural colonisation, rewetting measures and targeted revegetation.

Receptor: Land and Soils/land

Mitigation Measures: Any works undertaken as part of the rehabilitation plans will be completed in compliance with the licence from the EPA with the Applicant reporting to the EPA until the IPC Licence is surrendered.

The proposed Cutaway Bog Decommissioning and Rehabilitation Plans are bog specific, catering to the requirements of each individual bog given each bogs unique drainage and extraction history. Given that the objectives of the rehabilitation plans are to place the Application Site on a trajectory towards becoming a naturally functioning peatland, no mitigation measures are required except that the bog rehabilitation will be restricted to within the footprint of the Application Site.

7.5.2.3.2 *Peat-Land*

As discussed above, the overall aim of the rehabilitation plans is to put the bogs comprising the Application Site on a trajectory towards becoming naturally functioning peatlands. One of the main criteria which will be used to define the success of the rehabilitation plans will be the stabilisation of the former peat extraction activities and all ancillary works areas.

This stabilisation will be achieved primarily through natural colonisation of the former peat extraction activities and all ancillary works fields. These bare peat fields will likely develop in a similar manner to the areas of the Application Site which have been out of production for some time and are now covered in significant area of vegetation. The revegetation and rewetting of the Application Site will prevent surface erosion of peat which currently occurs in the degraded peatlands which cover the majority of the site.

Despite the best practice measures to be implemented as part of the rehabilitation plans it is very unlikely that the entire site will return to the same level of active peat forming conditions which likely existed at the Application Site prior to commencement of peat extraction activities and all ancillary works operations.

Pathway: Natural colonisation, rewetting measures and targeted revegetation.

Receptor: Peat

Mitigation Measures: Any works undertaken as part of the Remedial Phase will be completed as required by the licence from the EPA with Bord na Móna reporting to the EPA until the IPC Licence is surrendered.

7.5.2.3.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

During the Remedial Phase there will be some activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. This activity will be greatest during the initial stages of rehabilitation when works associated with rewetting and revegetation such as drain blocking will be completed. Once this work has been completed there will only be very limited activity at the Application Site which will mainly comprise of non-intrusive monitoring and minimal repairs to peat blockages and/or additional fertiliser application to aid the development of successional communities.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Mitigation Measures: The following environmental control measures will be implemented during the Remedial Phase in order to mitigate against leaks and spills:

- All machinery will be regularly checked and maintained prior to arrival at the site;
- Fuelling and lubrication of equipment will only be completed in designated areas and away from surface water features;
- Vehicles will never be left unattended during refuelling;
- All refuelling will occur in mobile fuel bowsers;
- Only dedicated, trained and competent personnel will complete refuelling operations;
- Fuel bowsers will be bunded to 100% capacity to prevent any spills;
- Storage tanks for bowsers and generators will be double-skinned;
- Waste oil and fluids will be collected in leak proof containers and removed from the site for disposal;
- Spill kits will be kept on site; and,
- All activities will be completed in accordance with current 'best practice' procedures.

7.5.2.3.4 *Peat Stability*

The rehabilitation plans aims to revegetate and rewet the Application Site. No additional peat will be removed from the Application Site, and no drainage will be installed during the Remedial Phase. The risk of peat failure at the Application Site will remain very low with no change observed from Section 7.5.2.1.4.

Pathway: Peat slide/Landslide.

Receptor: People, land and infrastructure.

Mitigation/Monitoring: No further mitigation, beyond that implemented and outlined in Section 7.5.2.1.4 are deemed necessary.

7.5.3 Residual Effect

7.5.3.1 Peat Extraction Phase (July 1988 – June 2020)

7.5.3.1.1 *Soils/land (Land take)*

Following the initial drainage, vegetation removal and clearance which occurred across much of the Application Site prior to 1988, the operations between 1988 and 2020 would not have resulted in any significant changes to land cover and there would have been no significant additional land take. The only effects in these areas postdating 1988 are minor annual topographic changes associated with peat removal for the majority of the Application Site.

Changes to soils/land would have occurred after 1988 where bogs were drained and stripped of vegetation however the change would have been consistent with the emerging trend established by the wider peat extraction activity. Peat extraction activities and all ancillary works first occurred in eastern Carranstown and the northwestern portion of Bracklin after 1988 and any subsequent changes to land and soils/land would have been limited to vegetation removal and slight topographic changes associated with peat extraction activities and all ancillary works. Meanwhile, Lisclogher West was drained by 1995, though never subject to peat extraction, and would have experienced a change in soils/land from remnant bog to a drained peatland.

These changes in soils/land are consistent with the trends associated with peat extraction activities and all ancillary works at the Application Site. By 1988, peat extraction activities and all ancillary works were well established at the Application Site and subsequent soils/land changes within the Application Site, i.e. the encroachment into vegetated (eastern Carranstown and the northwestern portion of Bracklin) and undrained areas (Lisclogher West), are consistent with the overall soils/land of the site.

The residual effect of the drainage and acrotelm removal post 1988 is a Permanent, Moderate , Negative Effect on the soils/land at the Application Site.

7.5.3.1.2 *Peat Extraction – Land*

Peat extraction activities and all ancillary works by their very nature will have a significant effect on peat and subsoils. The operations involve the permanent removal of peat from the Application Site resulting in a loss of peat depth at the Application Site. However, by 1988, peat extraction activities and all ancillary works was already well established at the Application Site, with ~1,626,398 tonnes of peat having been removed from the Application Site before 1988. Therefore, the continued removal of peat during the Peat Extraction Phase (July 1988- June2020) was consistent with the baseline trends which existed in 1988. For these reasons we consider the residual effect to be Permanent, Moderate, Negative Effect on peat subsoils at the Application Site.

7.5.3.1.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

No adverse effect occurred on the identified receptors. From review of the available Annual Environmental Reports (AER) it is understood that no significant fuel spills or wastewater discharges have occurred to groundwater prior to or since 2000, from any of the 5 no. bog units or associated ancillary activities.

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been implemented by the Applicant 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.

7.5.3.1.4 *Peat Stability*

No effect occurred on peat, subsoils and bedrock.

There was no residual effect peat, subsoils and bedrock.

7.5.3.1.5 Construction of Supporting Infrastructures and Buildings

Due to the small scale of the supporting infrastructures within the Application Site, it is considered that the residual effect to be Permanent, Imperceptible, Negative Effect on land, soils/land, peat and peat subsoils.

7.5.3.2 Current Phase (June 2020 – Present Day)

7.5.3.2.1 Land and Soils/land

A significant effect to the land/soil environment occurred following the cessation of the peat extraction activities and all ancillary works. The residual effect on soils/land is considered to be Permanent, Significant, Positive Effect on soils/land at the Application Site.

The residual effect on landcover and topography during this time period is considered to be imperceptible.

7.5.3.2.2 Peat Extraction

There was no residual effect on peat/subsoils.

7.5.3.2.3 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

No adverse effects were recorded. From review of the available AERs it is understood that no significant fuel spills or wastewater discharges have occurred to groundwater since summer 2020.

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been implemented. The residual effect is considered to be negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

7.5.3.2.4 Peat Stability

No residual effect on peat, subsoils and bedrock.

7.5.3.3 Remedial Phase

7.5.3.3.1 Land and Soils/land

The likely effect on land and soils/land following the implementation of the rehabilitation plan that is currently proposed is a Moderate, Positive, Direct, Long-Term effect on Land and Soils/land.

7.5.3.3.2 Peat-Land

The likely effect on peat following the implementation of the rehabilitation plan that is currently proposed is a Moderate, Positive, Direct, Permanent effect on peat as it will be wetter and closer to its natural condition with increases in vegetation cover across all bogs.

7.5.3.3.3 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been

implemented. We consider the residual effect to be Negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

7.5.3.3.4 *Peat Stability*

No residual effect on existing peat stability.

7.5.4 Significance of Effects

7.5.4.1 Peat Extraction Phase (July 1988 – June 2020)

7.5.4.1.1 *Soils/land (Land take)*

For the reasons outlined above, it is considered that there no significant effects on soils/land as a result of the peat extraction activities and all ancillary works from July 1988 to June 2020 as the activity was consistent with emerging trends at the Application Site.

7.5.4.1.2 *Peat Extraction – Land*

For the reasons outlined above, it is considered that there has been a significant effect on the peat soils and subsoils at the Application Site as a result of the peat extraction activities and all ancillary works.

7.5.4.1.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

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

7.5.4.1.4 *Peat Stability*

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.

7.5.4.1.5 *Construction of Supporting Infrastructures and Buildings*

For the reasons outlined above, and with the implementation of the building works in accordance with the planning permissions, it is considered that there has not been a significant effect on the peat soils and subsoils at the Application Site as a result of the construction of the supporting infrastructure.

7.5.4.2 Current Phase (June 2020 – Present Day)

7.5.4.2.1 *Land and Soils/land*

For the reasons outlined above no significant effects on land (to date, but it will change in vegetation cover over time), but there is a significant effect on soils/land, having changed from commercial peat extraction activities to recovering peatland habitats over an area of ~220 Ha.

7.5.4.2.2 *Peat Extraction*

For the reasons outlined above no significant effects on peat has occurred.

7.5.4.2.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on peat, subsoil and bedrock have occurred.

7.5.4.2.4 *Peat Stability*

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.

7.5.4.3 Remedial Phase

7.5.4.3.1 *Land and Soils/land*

For the reasons outlined above, it is considered that there will be a significant positive effect on land and soils/land as a result of the Remedial Phase.

7.5.4.3.2 *Peat-Land*

For the reasons outlined above, it is considered that there will be a significant effect on peat as a result of the Remedial Phase.

7.5.4.3.3 *Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry*

For the reasons outlined above, and with the implementation of the rehabilitation plans it is considered that there will be no significant effects.

7.5.4.3.4 *Peat Stability*

For the reasons outlined above, and with the implementation of the rehabilitation plans it is considered that there will be no significant effects.

7.5.5 Cumulative/In Combination Effects

7.5.5.1 Peat Extraction Phase (July 1988 – June 2020)

The geological impact assessment undertaken above in this chapter outlines those significant effects that have occurred within the Application Site as a result of the Peat Extraction Phase of the Project.

Due to the localised nature of the works associated with the peat extraction activities and all ancillary works within the Application Site boundary, the potential for significant cumulative effects with other local developments (located outside the site, including forestry, agricultural development) on the land, soils and geological environment would have been imperceptible. The only way the peat extraction activities and all ancillary works could have had cumulative effects with other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 8.

Third party and private sod peat cutting was occurring within the Application Site during this time period (1988 – 2020). However no significant cumulative effects on the land, soils and geological environment will have occurred due to:

- These works were not overlapping with any of the Applicants peat extraction activities and all ancillary works areas;
- The small area of the private peat extraction in comparison to the Applicant's operations;

- The volumes of peat removed by private peat extraction would be very small in comparison to the volumes removed the Applicant; and,
- Any drainage required by the private peat extraction would be of a very small scale when compared with that implemented by the Applicant.

As such no significant cumulative effects have occurred between the Applicant's operations and the third-party private peat cutting at the Application Site.

The Peat Extraction Phase (1988-2020) continued the peat extraction activities and all ancillary works and site preparation works which were completed previously at the Application Site between 1948 and 1988. The cumulative effect of the Peat Extraction Phase with the works completed prior to 1988 was the removal of 4,832,652m^3 of peat from the Application Site (1,951,677m^3 prior to 1988 and 2,880,975m^3 between 1988 and 2020). Therefore, there was a significant cumulative effect on peat within the Application Site.

7.5.5.2 Current Phase (June 2020 – Present Day)

The geological impact assessment undertaken above in this chapter outlines those significant effects have occurred within the Application Site as a result of the Current Phase of the Project.

As outlined in Section 7.5.3.2, the potential for significant cumulative effects with other local developments (located outside the Application Site (i.e. forestry, agriculture, and turbary peat extraction) on the land, soils and geological environment would have been imperceptible.

Due to the activity at the site being limited to stockpile removal and environmental monitoring during the Current Phase, the potential for cumulative effects arising from the Project are significantly decreased in comparison to the Peat Extraction Phase. Furthermore, third party sod peat extraction was terminated in June 2020, eliminating the potential for cumulative effects to arise.

As such no significant cumulative effects on the land, soils and geological environment have arisen during the Current Phase of the Project.

7.5.5.3 Remedial Phase

Due to the localised nature of the proposed works associated with the Remedial Phase within the Application Site boundary, the potential for significant cumulative effects with other local developments on the land, soils and geological environment will be imperceptible. There will be very limited movement of peat during the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, and all proposed works will be local to the Application Site.

The only way the rehabilitation plans could have cumulative effects with other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 8.

The proposed decommissioning and rehabilitation plans for the Application Site will either coincide with or postdate the construction of the proposed Ballivor Wind Farm if this wind energy application is permitted.

7.5.5.4 Overall Cumulative Assessment

Due to the localised nature of the works associated with the peat extraction activities and all ancillary works within the Application Site boundary, the potential for significant cumulative effects with other local developments on the land, soils and geological environment would have been imperceptible. The only way the peat extraction activities and all ancillary works could have had cumulative effects with

other off-site projects and plans is via the drainage and off-site surface water network, and this hydrological pathway is assessed in Chapter 8. In summary:

- Peat extraction works have ceased;
- Any works associated with the Cutaway Bog Decommissioning and Rehabilitation Plan are small and localised within the Applicant's lands;
- The volumes of peat to be moved during the proposed wind farm development will be small in comparison to the large volumes of residual peat remaining on the Application Site; and,
- The permitted Bracklyn Wind Farm development does not overlap with any of the Applicant's lands, and therefore cannot have a cumulative effect on Soils and Geology.

Likely Residual Effect: No cumulative effects on soils and geology with off-site projects can over as there can be no overlapping outside of the Applicant's land.

There will be a slight cumulative effect with on Land, Soils and Geology for the proposed Ballivor Wind Farm, but the effect is limited by the small footprint of the wind farm relative to the overall Application Site area.

There will be a slight cumulative effect with on Land for the adjacent permitted Bracklyn Wind Farm and the proposed Ballivor Wind Farm, but the effect is limited by the small footprint of both wind farms relative to the overall Ballivor bogs area.

Significance of Effects: For the reasons outlined above, and with the implementation of the Decommissioning and Rehabilitation Plan we consider that there will be no significant cumulative effects on the Land, Soils and Geology environment.

7.5.6 Conclusions

The Application Site comprises 5 no. Bord na Móna bogs situated between the towns of Kinnegad and Delvin, Co. Westmeath. The bogs comprising the Application Site include Ballivor Bog to the south, Carranstown and Bracklin bogs towards the centre and Lisclogher and Lisclogher West bogs at the northern end of the site. The total Application Site area is approximately 2,421ha (24.21km^2). The current topography of the Application Site is relatively flat with an elevation range of between approximately 69 and 86mOD (metres above Ordnance Datum).

The baseline for the assessment of peat extraction activities and all ancillary works at the Application Site is 1988, and the Peat Extraction Phase covers the period between July 1988 and June 2020. The Applicant commenced works at Ballivor Bog Group in 1948. By 1988 peat extraction activities and all ancillary works were well established at Ballivor, Bracklin, Lisclogher and Carranstown bogs.

From a land, soils and geology perspective, the main impacts occurred during the early stages of drainage and peat extraction when the acrotelm (topmost living peat layer) was removed and the extraction of the peat (catotelm) began. These impacts occurred at different times across the Application Site ranging from drainage of Ballivor Bog in 1948 to drainage of Lisclogher West in the early 1990s. These site preparation works had been completed across the majority of the Application Site prior to 1988 and any subsequent activities in these areas would not have resulted in any significant changes, with the only effects resulting from minor annual topographic changes associated with peat removal, and other excavations associated with drainage maintenance. However, some areas of the Application Site have underwent site preparation works including vegetation clearance (eastern Carranstown and the northwestern section of Bracklin) and the installation of drainage (Lisclogher West) since 1988. These areas of the site would have experienced a change in soils/land with this change being consistent with the emerging trend established by the wider peat extraction activity within the Application Site. The peat extraction activities and all ancillary works are therefore considered to have resulted in a moderate negative effect on the land, soils and geological environment.

The proposed Cutaway Bog and Decommissioning and Rehabilitation Plans for the Application Site have also been assessed. The plans will typically involve the rewetting and revegetation of the drained bogs. These plans will have a positive effect on the soils/land across the Application Site, with rewetting of bare peat areas. The Application Site will never return fully to the original raised bog which was present before commencement of the peat extraction activities and all ancillary works, but the implementation of the Cutaway Bog and Decommissioning and Rehabilitation Plans will have a positive effect of land and soils/land, and on the coverage of vegetation at ground level across each of the bogs when compared to the 1988 baseline condition of the lands.

This assessment confirms that no cumulative effects on land, soil and geology environment have resulted from the Peat Extraction Phase. Similarly, no cumulative effects will result from the implementation of the decommissioning and rehabilitation plans, nor from the proposed wind farm development at the site. Effects on the land and soils environment will only occur as direct effects, local to the point of extraction/excavation, and therefore cannot extend beyond the boundary of the bogs.

8. HYDROLOGY AND HYDROGEOLOGY

8.1 Introduction

8.1.1 Background and Objectives

Hydro-Environmental Services (HES) was engaged by MKO Ireland (MKO) to provide a description and assessment of the residual direct and indirect actual and potential effects of the peat extraction activities and all ancillary works at Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs (the "Application Site") on the water aspects (hydrology and hydrogeology) of the receiving environment, from 1988 to the present day. This chapter will also assess the potential impacts of the proposed rehabilitation plans for the Application Site following the cessation of peat extraction activities and all ancillary works in 2020. The Application Site is located within the Ballivor Bog Group and is situated between the towns of Raharney and Delvin, Co. Westmeath and Ballivor, Co. Meath.

As stated in Chapter 4, July 1988 is the baseline environment as this is the date by which the EIA (Directive 85/337/EEC) Directive 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 required transposition of the EIA Directive. Nevertheless, for completion, we provide a brief overview of the activities occurring at the Application Site from 1948 and the onset of site preparation works up to July 1988. The baseline hydrological and hydrogeological environment in the year 1988 is then described in detail along with a description of the description of activities from 1988 to the cessation of peat extraction activities and all ancillary works in June of 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future.

This chapter presents:

- An assessment of impacts of the peat extraction activities and all ancillary works on the hydrological and hydrogeological environment;
- The baseline sensitivity of the receiving hydrological and hydrogeological environment has been assessed based on the baseline site conditions present in 1988;
- The impacts of the receiving hydrological and hydrogeological environment which have been assessed over 3 no. phases of the life cycle of the development. These phases include the Peat Extraction Phase (1988 – 2020), the Current Phase (2020 – present day) and the Remedial Phase, as described in Chapter 4;
- The control and monitoring measures that were implemented during the Peat Extraction Phase from July 1988 to June 2020;
- The control and monitoring measures that were implemented during the Current Phase from June 2020 to the present day;
- The proposed mitigation measures associated with the proposed Cutaway Bog Decommissioning and Rehabilitation Plans (Remedial Phase); and,
- The residual effects along with the cumulative effects from the proposed Ballivor Wind Farm development and other projects in the vicinity of the Application Site.

8.1.2 Statement of Authority

Hydro-Environmental Services (HES) are a specialist geological, hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core areas of expertise and experience include bog hydrology and windfarm drainage design. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types.

This chapter of the rEIAR was prepared by Michael Gill and Conor McGettigan.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous geological, hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. For example, Michael has worked on the EIARs for Oweninny WF, Cloncreen WF, and Yellow River WF, and over 120 other wind farm related projects across the country. Michael has also worked on rEIARs for Cleanrath WF, 41 no. Bord na Móna bogs, and also for a number of quarry sites.

Conor McGettigan (BSc, MSc) is an Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin, graduating with a First-Class Honours degree. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin (First Class Honours). Conor has completed numerous land, soils and geology chapters for several developments on peatlands. Conor has also completed geological and hydrological studies on sensitive peatlands sites, including Clonaslee Bog, the Liffey Head Project, and Keerglen WF and Kilsallagh WF.

8.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Chapter 2 of the rEIAR. Details of these scoping responses pertaining to hydrology and hydrogeology are listed below and outlined in Chapter 2 of this rEIAR.

Inland Fisheries

A scoping request was issued to Inland Fisheries on the 2nd of December 2021 and again on the 14th February 2024. At the time of writing this chapter in July 2024, no response has been received.

Uisce Eireann

A scoping request was issued to Uisce Eireann (formerly known as Irish Water) on the 2nd of December 2021 and again on the 14th February 2024. An acknowledgement of the request was issued on in December 2021 and a response was received on the 20th of March 2024. Further detail on scoping is provided in Chapter 2 Section 2.6 of this rEIAR, and a copy of the response is provided in Appendix 2-1.

Uisce Éireann highlight key considerations for Water Services in Environmental Impact Assessments (EIAs). These include measures to protect Drinking Water Sources, waste sampling for backfilling materials, mitigations for negative impacts on water sources, assessments of impacts on nearby reservoirs and water services capacity, and considerations for connecting to Uisce Éireann networks. Developers are advised to identify infrastructure needs, assess potential impacts on water sources and catchments, and propose mitigation strategies to ensure zero risk to Uisce Éireann drinking water sources. These guidelines aim to safeguard water resources and infrastructure during development projects.

Waterways Ireland

A scoping request was issued to Waterways Ireland was issued on the 2nd of December 2021 and again on the 14th February 2024.

A response was received on the 15th February 2024 confirming that the Application Site is not within any Zone of Influence of their waterways and therefore they will not be commenting.

Geological Survey of Ireland

A scoping request was sent to the Geological Survey of Ireland (GSI) on the 2nd of December 2021 and again on the 14th February 2024. A response was received on the 21st of December 2021 and on the 28th of February 2024 which comprised the following:

- List of relevant available datasets;
- Recommend referring to GSI Groundwater and Geothermal Unit run GW Climate project which is a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland. This is a follow on from a previous project (GWFlood); and,
- Requested copy of reports detailing any site investigations carried out.

Environmental Protection Agency (EPA)

A scoping request was sent to the GSI on the 2nd of December 2021 and again on the 14th February 2024. A response was received on the 21st of January 2022 and on the 27th of March 2024 which comprised the following:

The Agency is of the opinion that the scope and level of detail to be included in the remedial environmental impact assessment report should as a minimum:

a) address the matters raised in the responses received from relevant bodies;
b) have regard to the rehabilitation plan(s) required under Condition 10 of Licence Reg No. P0501 for any relevant bog areas;
c) consideration should be given to inclusion of any relevant bog areas in an enhanced rehabilitation scheme, e.g., under the Peatlands Climate Action Scheme (PCAS).
d) have regard to relevant water quality monitoring data. Any gaps in water quality data for receiving waters should be filled by a sampling programme over an appropriately representative period of time.

8.1.4 Relevant Legislation

The rEIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU.

The requirements of the following legislation are complied with:

- Planning and Development Acts, 2000 (as amended);
- Planning and Development Regulations, 2001 (as amended);
- S.I. No 296/2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of the EIA Directive as amended by the Directive 2014/52/EU into Irish Law;
- EU Directives 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and 79/409/EEC on the conservation of wild birds (the Birds Directive);
- S.I. No. 293/1988: Quality of Salmon Water Regulations;
- S.I. No. 272/2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended, and S.I. No. 722/2003 European Communities (Water Policy) Regulations, as amended, which implement EU Water Framework Directive

(2000/60/EC) and provide for the implementation of 'daughter' Groundwater Directive (2006/118/EC);
- S.I. No. 684/2007: Waste Water Discharge (Authorisation) Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249/1989: Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (as amended by 2000/60/EC in 2007);
- S.I. No. 122/2014: European Union (Drinking Water) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive);
- S.I. No. 9/2010: European Communities Environmental Objectives (Groundwater) Regulations 2010, as amended; and,
- S.I. No. 296/2009: European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009, as amended.

8.1.5 Relevant Guidance

The Hydrology and Hydrogeology chapter of the rEIAR is carried out in accordance with the guidance contained in the following:

- Environmental Protection Agency (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);
- Environmental Protection Agency (2003) Advice Notes on Current Practice (in the preparation of Environmental Impact Statements);
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry;
- Environmental Protection Agency (2002) Guidelines on the Information to be Contained in Environmental Impact Statements;
- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (2006);
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006);
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

8.2 Methodology

8.2.1 Desk Study

A desk study of the Application Site and the surrounding area was completed to collect all relevant hydrological and hydrogeological data for the Application Site and the surrounding area. This included consultation of the following:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive "catchments.ie" Map Viewer (www.catchments.ie), including all relevant River Basin Management Plans (RBMPs);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 13 (Geology of Meath); Geological Survey of Ireland (GSI, 1999);
- Geological Survey of Ireland - Groundwater Body Characterisation Reports;
- OPW Indicative Flood Maps (www.floodmaps.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

8.2.2 Monitoring and Site Investigation Data

HES completed site inspections, walkover surveys, drainage mapping, and baseline monitoring/sampling at the Application Site as part of this remedial Environmental Impact Assessment and to inform the proposed Ballivor Wind Farm planning application. In summary, site investigations conducted by HES included the following:

- A total of 199 no. peat probe depths/investigations points were carried out by HES (456 no. peat probes in a combined HES, Fehily Timoney, and MKO) in Ballivor, Carranstown, Bracklin and Lisclogher Bogs. No peat probing investigations were conducted in Lisclogher West as no peat extraction activities or ancillary works occurred in this bog and was not included in the proposed Ballivor Wind Farm planning application;
- Logging of subsoil exposures across the Application Site where mineral soils and peat profiles are exposed;
- Walkover surveys and hydrological mapping of the Application Site and the surrounding area were undertaken whereby water flow directions and drainage patterns were recorded;
- Field hydrochemistry measurements (electrical conductivity, pH, dissolved oxygen and temperature) and surface water flow measurements were taken to determine the origin and nature of surface water flows surrounding the Application Site during 3 no. monitoring rounds (21st April, 28th October 2021 and 19th January 2022); and,
- A total of 52 no. surface water samples were taken to determine the baseline water quality of the primary surface waters originating from the proposed development site during the 3 no. monitoring rounds.

Site-specific data obtained by HES was supplemented with recent and historic site-specific data supplied by Bord na Móna (the Applicant). These included Lidar data of the Application Site, a peat depth database and water quality monitoring from 2000 to 2023 in compliance with the IPC Licence requirements.

8.2.3 Impact Assessment Methodology

The guideline criteria (EPA, May 2022) require that the baseline environment is described in terms of the context, character, significance and sensitivity of the existing environment. The descriptors used in this environmental impact assessment are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 of this rEIAR.

In addition to the above methodology, the importance of the water environment receptors was assessed on completion of the desk study and site investigations. Levels of importance which are defined in Table 8-1 and Table 8-2 for the hydrological and hydrogeological environments are used to assess the effects that peat extraction activities and all ancillary works may have had on them.

Table 8-1: Estimation of Importance of Hydrology Criteria (NRA, 2008)

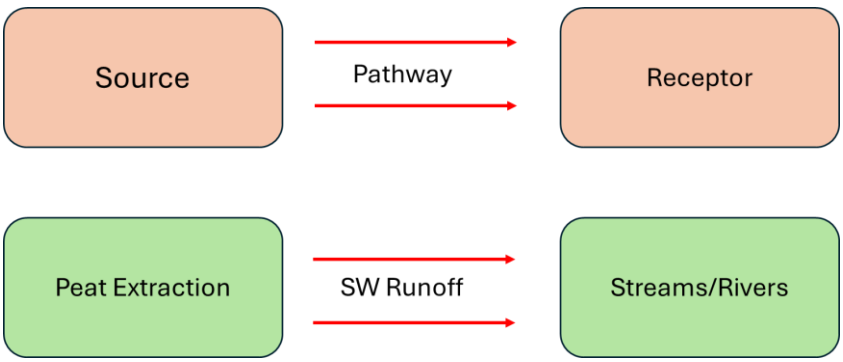
Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes. Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for a wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	Salmon fishery locally important potable water source supplying >1000 homes. Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding.
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery. Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities. Local potable water source supplying <50 homes. Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

Table 8-2: Estimation of Importance of Hydrogeology Criteria (NRA, 2008)

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation - NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides a large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer. Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes.

8.2.4 Overview of Impact Assessment Process

The conventional source-pathway-receptor model (see below, top) was applied to assess the potential effects on downstream environmental receptors (see below, bottom as an example, earthworks = peat extraction) as a result of the peat extraction activities and all ancillary works.



The descriptors used in this impact assessment are those set out in the EPA (2022) glossary of effects as shown in Chapter 1 of this rEIAR. The description process clearly and consistently identifies the key

aspects of any impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

8.3 Site Landuse History Summary

The Application Site comprises five bogs located at the Westmeath-Meath County border. The bogs include Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West bogs. The Application Site comprises an area of 2,421 hectares (ha) within which bog drainage works began in 1948 followed by the commencement of peat extraction activities and all ancillary works from 1954 to 2020. The Application Site is located 2.5 km south-southeast of Delvin, 3.7km east of Raharney and 2.2km west of Ballivor Village. The Application Site location is shown on **Figure 1-1 and Figure 1-2**. The landcover within the Application Site comprises a mix of bare cutaway peat, re-vegetated peat, degraded blanket bog, scrub, low woodland, remnants of high bog and a very small area of conifer plantation. Today, the site topography today ranges between 86 m above ordnance datum (m AOD) at its highest point to 69m AOD at its lowest point. For a full details of the Application Site description and location please see Chapter 4: Description of Development.

8.3.1.1 Site Topography

The topography of the Application Site has changed through time due to the historic peat extraction activities and all ancillary works. As discussed in Chapter 7: Land Soils and Geology the topography of the site was estimated to range between 72 and 89mOD prior to the onset of any peat extraction activities and all ancillary works or associated site preparation works (*i.e.* drainage and acrotelm removal). The topography has subsequently been lowered at each of the bogs due to drainage related subsidence and in the historic peat extraction activities and all ancillary works areas due to the removal of peat. Full details of the topography of the Application Site are presented in Section 7.3.2 of this rEIAR.

8.3.1.2 Historic Landuse Changes

The primary land-use change associated with the peat extraction activities and all ancillary works process occurs during the initial drainage of the bog in advance of peat extraction activities and all ancillary works. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. At this time at the Application Site, ancillary features were also constructed including railway lines, machine passes, canteens, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks and peat loading facilities. After the site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. During the Peat Extraction Phase, only minimal landuse change occurred which predominantly related to minor annual topographic changes caused by ongoing peat extraction activities and all ancillary works. While the peat extraction activities and all ancillary works was ongoing it was not possible to rehabilitate the underlying peatland.

Land and landuse changes were investigated from 1988 to the present day. A full description of landuse changes across the Application Site is described in Chapter 7 Section 7.3.3. The primary change to land during the peat extraction activities and all ancillary works process occurred during the initial site drainage and the removal of vegetation in preparation for the peat extraction activities and all ancillary works operations. The timing of drainage and initiation of peat extraction activities and all ancillary works varies across the Application Site. Ballivor Bog was the first bog to be drained between 1948 and 1953 and would have experienced a relatively abrupt change in land cover from this date to the beginning of commercial peat extraction activities and all ancillary works in 1953.

By 1988, Ballivor, Bracklin, Lisclogher (main bog area) and Carranstown bogs had all been drained. At this time some peat extraction activities and all ancillary works had already begun in some areas of the Application Site including Ballivor, the western portion of Carranstown, the main area of Bracklin, the southern portion of Bracklin West and Lisclogher bogs. Elsewhere vegetation remained in the northern section of Bracklin Bog and the eastern section of Carranstown Bog in 1988 despite drainage ditches

having already been inserted. In contrast to the other bogs, Lisclogher West remained as a raised bog up until 1973, when drainage works were initiated. Peat was never extracted from Lisclogher West, therefore, any significant changes to land and landcover would have occurred when the bog was drained between 1973 and 1995. Drainage works also commenced in the eastern section of Carranstown Bog in between 1974 and 1987, with peat extraction activities and all ancillary works beginning at some date preceding 1995.

Peat extraction activities and all ancillary works were formally ceased at the Application Site by the Applicant in June 2020. This will allow the former bare peat production fields to revegetate, however, this will likely take some time and measures to aid the site rehabilitation are outlined in the Applicant's Cutaway Bog Decommissioning and Rehabilitation Plans (Appendix 4-2).

8.3.1.3 Existing Site Description and Topography

Currently, the Application Site is covered in a mosaic of peatland habitats reflecting the contrasting timescales and intensities of peat extraction activities and all ancillary works undertaken across the site. Those areas from which peat was most recently extracted such as Ballivor, Bracklin West and Carranstown are covered by bare peat fields. Other areas in the site which have not been subject to peat extraction activities and all ancillary works for some time such as Bracklin and Lisclogher have already experienced significant natural recolonisation. Peat was never extracted from Lisclogher West and as a result retains many of its natural raised bog features, although it is partially drained.

In terms of hydrology, all bog units within the Application Site have been drained or partially drained to facilitate peat extraction activities and all ancillary works or intended peat extraction activities. This drainage has lowered the local water table in the peat and provided preferential pathways for surface water to leave the site via the manmade drainage system. Even Lisclogher West, from which peat was never extracted, is degraded with vegetated dry peat fields and deep drainage channels which were constructed between 1973 and 1995.

The following paragraphs describe each of the individual bogs comprising the Application Site. The general topography of the 5 bogs is illustrated in Plate 8-1.

Ballivor Bog has a total area of 638ha and had a peat extraction activity and all ancillary works area of 473ha which was subject to peat extraction activities and all ancillary works until June 2020. The topography within the bog ranges from 70 - 79mOD. Ballivor Bog is currently drained by a series of northwest-southeast orientated drains spaced at approximately 15m intervals. 2 no. production centres are located in the north of Ballivor Bog from which a railway extending southwards into the bog interior. The Applicant's current habitat map for Ballivor Bog (2024) (refer to Ballivor Bog 2024 Draft Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that the northeast of the bog is characterized by areas of bare peat. The lack of vegetation in this area indicates that this area was the most recent area of Ballivor Bog from which peat was being extracted. Meanwhile, areas in the west and south of Ballivor Bog contain a mosaic of heath, heath and scrub and pioneer open cutaway habitats. The presence of vegetation indicates that peat extraction activities and all ancillary works has not occurred recently in these areas. Ballivor Bog is fringed by cutaway and cutover bog in the northeast and remnant bog with some areas of birch woodland in the southwest.

Carranstown Bog has a total area of 304ha and a peat extraction activity and all ancillary works area of 80ha which was subject to peat extraction activities and all ancillary works until June 2020. A total of 117 hectares were drained but not subject to peat extraction activities and all ancillary works. The topography within the bog ranges from 68 - 75mOD. The bog is currently drained by a series of northwest-southeast orientated drains. A railway line dissects the site from the R156 in the south in a north-westerly direction. The Applicant's current habitat map for Carranstown Bog (2022) (refer to Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that much of the interior of the bog comprises of bare peat fields. Note that approximately three quarters of the bog was in milled peat extraction up to June 2020. Meanwhile, to the east and west there are areas of heath, heath and scrub and woodland.

Bracklin Bog has a total area of 772ha and a peat extraction activity and all ancillary works area of 351ha which was subject to peat extraction activities and all ancillary works until 2003. Recent peat extraction activities and all ancillary works was concentrated in a small section in the west of the bog, referred to as Bracklin West. The topography within the bog ranges from 71 - 86mOD. The bog is drained by a series of northeast-southwest orientated drains. The bog is served by a railway line which extends to the north and west across Bracklin Bog. The Applicant's current habitat map for Bracklin (2024) (refer to Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that much of the main bog area currently comprises of a mosaic of heath, scrub, woodland and pioneer open cutaway habitats. Bracklin West currently comprises of bare peat fields, indicative of the recent peat extraction activities and all ancillary works activities in this area of the site. Meanwhile, the south of Bracklin Bog contains some areas of birch woodland with areas of remnant high bog recorded in the north of Bracklin Bog.

Lisclogher Bog has a total area of 479ha and sod peat extraction activities was underway across 378 hectares of the bog. While third party peat extraction activities and all ancillary works was ongoing in the northeast of the bog until 2020, milled peat extraction activities and all ancillary works had ceased there in March 2003. Lisclogher is drained by a series of east-west orientated drains. The topography within the bog ranges from 69 - 76mOD. The Applicant's Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan states that the drainage system is beginning to break down with many drains becoming blocked and filling with water. A railway line extends from Bracklin Bog to the south into the interior of Lisclogher Bog. The Applicant's current habitat map for Lisclogher Bog (2024) (refer to Lisclogher Bog Cutaway Bog Decommissioning and Rehabilitation Plans included in Appendix 4-2) shows that much of the interior of the bog is comprised of a mosaic of pioneer open cutaway habitats, scrubland, and heath habitats. Some fingers of bare peat extend from the railway line to the east and west.

Lisclogher West has a total area of 228ha. Drainage infrastructure was installed in Lisclogher West Bog during 1988 and subsequent years across an area of approximately 22ha, as deduced from available aerial imagery. Lisclogher West was never subject to peat extraction activities and all ancillary works. The topography within the bog ranges from 77 - 82mOD. The existing remnant high bog is relatively dry due to the presence of a series of northwest-southeast orientated drains. No railway line of production centres are present within Lisclogher West. The Applicant's current habitat map for Lisclogher West (refer to Lisclogher West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-2) shows that majority of the site is classified as containing bog habitats, fringed to the north and south by woodland.

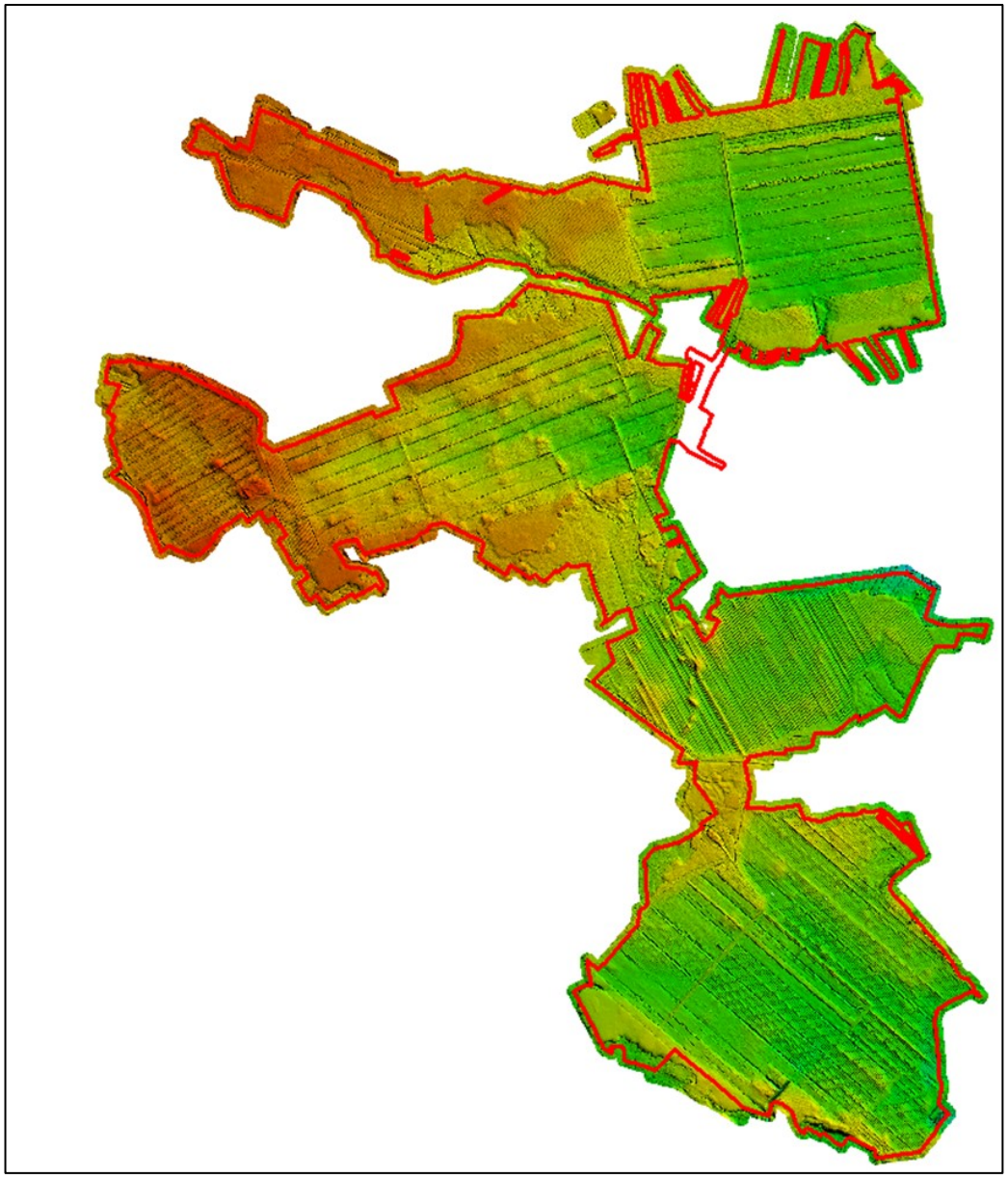


Plate 8-1 Topography across the Application Site

8.4 Establishing the 1988 Baseline Environment

8.4.1 Water Balance

Long term rainfall and evaporation data were sourced from Met Éireann. The 30-year annual average rainfall recorded at the Ballivor rainfall station, located ~4.5km east of the Application Site are presented in **Table 8-3**.

Table 8-3 Local Average long-term Rainfall Data (mm)

Station		X-Coord		Y-Coord		Ht (MAOD)		Opened		Closed		
Ballivor		268500		254200		68		1943		N/A		
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
86	61	65	55	62	58	54	76	75	83	80	85	839

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Mullingar, approximately 17km west of the Application Site. The long-term average PE for this station is 445mm/yr. This value is used as the best estimate of the site PE. Actual Evaporation (AE) at the Application Site is estimated as 423mm/yr (which is 0.95 × PE).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

Effective rainfall (ER) = AAR – AE

= 839 mm/yr – 423mm/yr

ER = 416mm/yr

Based on groundwater recharge coefficient estimates from the GSI (www.gsi.ie) an estimate of 17mm/year average annual recharge is given for basin peat in this area (recharge coefficient of ~4%). This means that the hydrology of the Application Site is characterised by very high surface water runoff rates and very low groundwater recharge rates. Therefore, conservative annual recharge and runoff rates for the Application Site are estimated to be 17mm/yr and 399mm/yr respectively.

This water balance is unlikely to have changed significantly from the predevelopment period to the present day. Raised peat bogs are an excellent store of water. Pre-development when the storage capacity of the peat is reached surface water runoff will occur whereby rainwater would have moved slowly across the bog before discharging to fens and other wetland habitats at the bog margin. In the present day, however, drainage channels act as preferential flowpaths which allow surface water to leave the site. These channels generally have a low gradient and the on-site drainage systems have some inherent storage and attenuation, and likely release runoff water at slightly higher rates than that of predevelopment times.

8.4.2 Regional and Local Hydrology

Regionally the Application Site is located in the Boyne surface water catchment within Hydrometric Area 7 of the Eastern River Basin District.

The Boyne catchment has a total area of 2,694km^2 and includes all areas drained by the River Boyne. The source of the Boyne is at Trinity Well, located to the southeast of Carbury, Co. Kildare and approximately 18km southeast of the Application Site. The Boyne flows west from the Trinity Well, turning north at Edenderry, passing through the raised bog landscape of north Kildare, after which it is

joined by the Yellow River. The Boyne then continues to flow to the northeast and the town of Trim, flowing approximately 5km east of Ballivor Bog. In the vicinity of the site, the main tributaries which discharge into the Boyne include the Deel (Raharney) and the Stonyford rivers. Further downstream, the Athboy River confluences with the Boyne before the Boyne flows to the east through the town of Trim. The Boyne then flows towards Navan after which it continues eastwards before becoming tidal to the west of the M1 motorway. The Boyne estuary flows through Drogheda and out to the Irish Sea between Haven and Mornington Point. A regional hydrology map is shown in Figure 8-1.

On a more local scale, the majority of the Application Site is located in the River Boyne sub-catchment (Boyne_SC_050) with much of Ballivor Bog and a small section in the southwest of Bracklin Bog located in the Boyne_040 sub-catchment. Additionally, a small area in the northwest of Bracklin Bog is located in the River Deel sub-catchment (Deel[Raharney]_SC_010).

Within the Deel[Raharney]_SC_010, the River Deel (EPA Code: 07D01) flows to the southeast approximately 1km west of Bracklin Bog. The River Deel flows to the southeast entering the Boyne_040 sub-catchment to the south of Raharney before reaching its confluence with the River Boyne (EPA Code: 07B04) approximately 4.5km south of Ballivor village. As stated above much of the site is located in the Boyne_060 sub-catchment, with the Stonyford River (EPA Code: 07S02) flowing to the southeast approximately 700m east of Lisclogher Bog. The Stonyford River discharges into the Boyne approximately 7km east of Ballivor Bog. A local hydrology map is shown in Figure 8-2.

An error has been observed in the EPA blueline watercourse mapping database in Lisclogher Bog. The EPA map a small watercourse, referred to as the Cartenstown stream, to flow to the southeast across Lisclogher Bog as shown in Figure 8-3. However, site walkover surveys and drainage mapping have shown that this watercourse does not exist on-site. The true drainage regime and flow directions in this area of the Application Site are shown on Figure 8-4. This drainage map has been produced following walkover surveys and drainage mapping of Lisclogher Bog. The on-site inspections were supplemented with the analysis of lidar data. The lidar data does not indicate the presence of any channel that may be associated with a surface watercourse. Indeed there are several topographic highs located along the cross-section meaning that it would be impossible for surface water to flow unimpeded from Point A to D. This lidar analysis supports the on-site observations and drainage mapping meaning that there is a local error in the EPA watercourse mapping in Lisclogher Bog. Such small local errors are infrequent in EPA mapping; however, they do exist where manmade drainage has been imposed upon natural drainage regime. The local hydrology map includes the corrections to the drainage on and around Lisclogher bog.

Table 8-4 summarises the location and receiving waterbodies of each of the 5 no. bogs which comprise the Ballivor Bog Group in accordance with the Water Framework Directive (WFD) waterbody classifications.

Table 8-4: WFD Catchments, sub-catchments and river-basins and receiving waterbodies of the Ballivor Bog Group

Bog Name	Catchment	Sub-catchment	River Sub-basin
Ballivor	River Boyne	West of the bog is located in Boyne_SC_040	Deel(Raharney)_060
		East of the bog is located in Boyne_SC_050	Boyne_060
Carranstown	River Boyne	Boyne_SC_050	South of the bog is located in Boyne_060
			North of the bog is located in Stonyford_040
Bracklin	River Boyne	East and centre of the bog are located in Boyne_SC_050	East and centre of the bog is located in Stonyford_040
		Small area in southwest of the bog is located in Boyne_SC_040	Small area in the southwest of the bog is located in Deel(Raharney)_060
		Northwest of the bog is located in Deel[Raharney]_SC_010	Small area in the west of the bog is located in Deel(Raharney)_040
			Small area in the northwest of the bog is located in Deel(Raharney)_030
Lisclogher	River Boyne	Boyne_SC_050	Stonyford_040
			Small area in the north of the bog is located in Stonyford_030
			Stonyford_020 EPA mapping and WFD river-sub basins are incorrectly mapped at Lisclogher Bog and some of the site drains to the northwest into the Stonyford_020 SWB.
Lisclogher West	River Boyne	Boyne_SC_050	Located in Stonyford_040

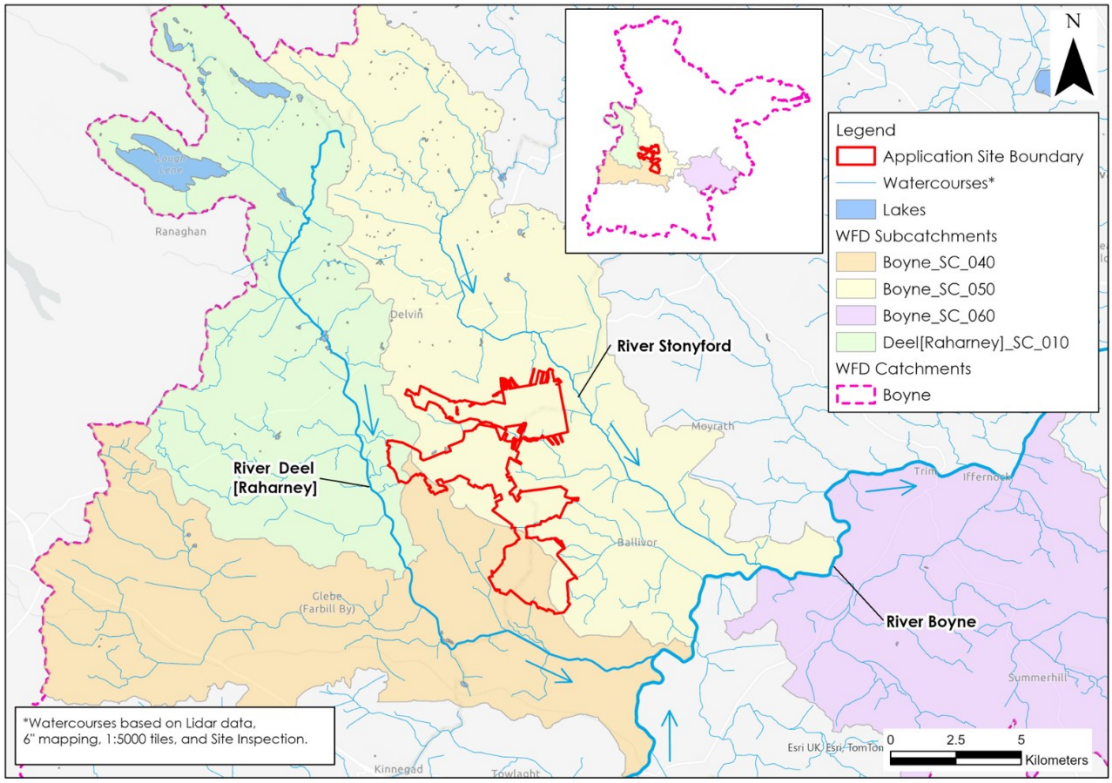


Figure 8-1: Regional Hydrology Map

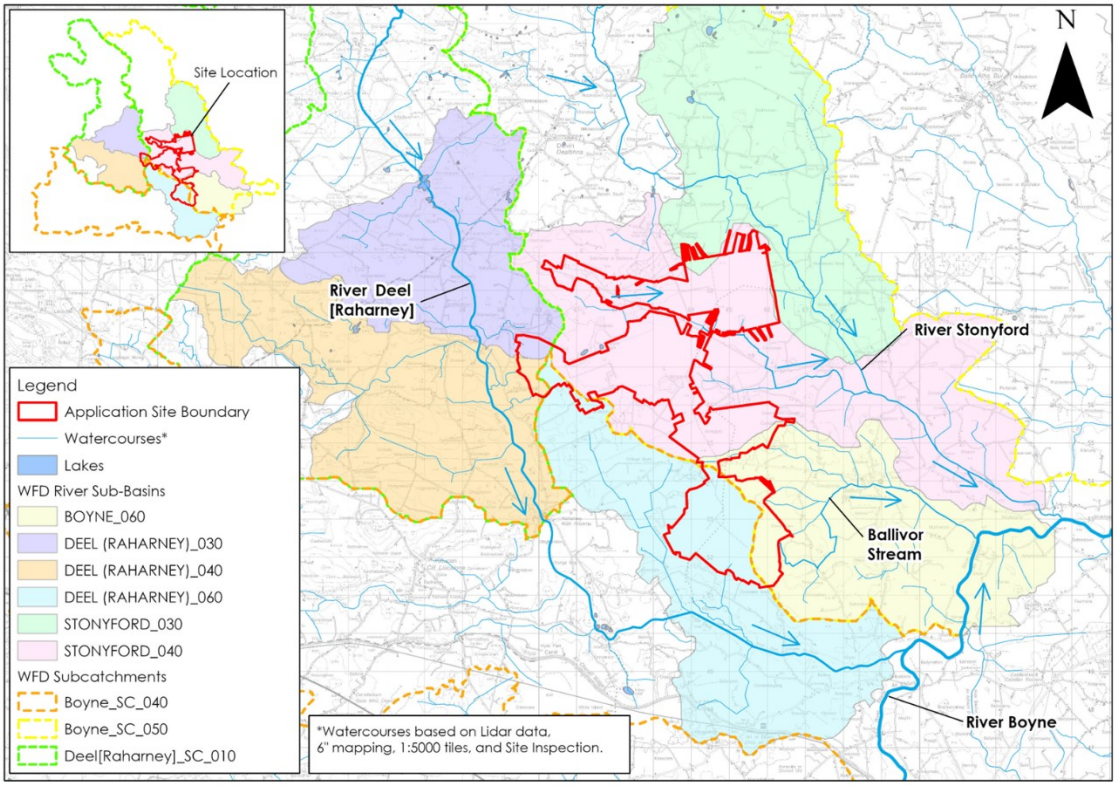


Figure 8-2: Local Hydrology Map

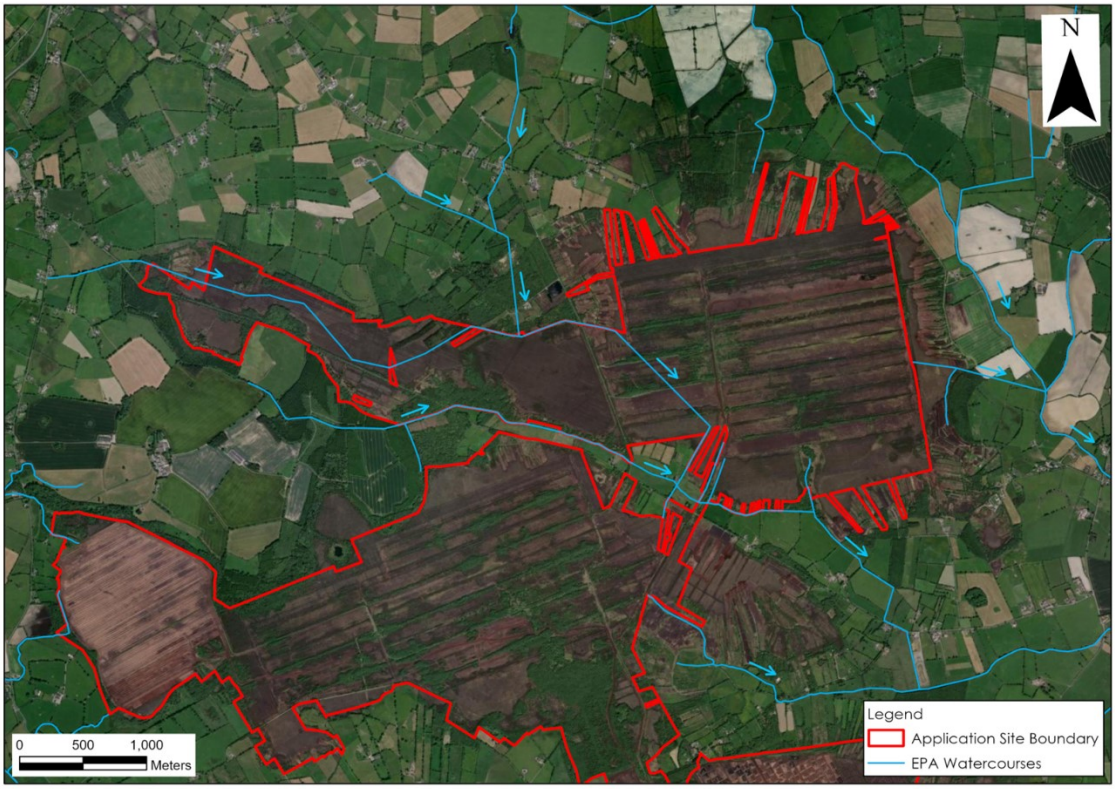


Figure 8-3: EPA Watercourse Mapping in Lisclogher Bog

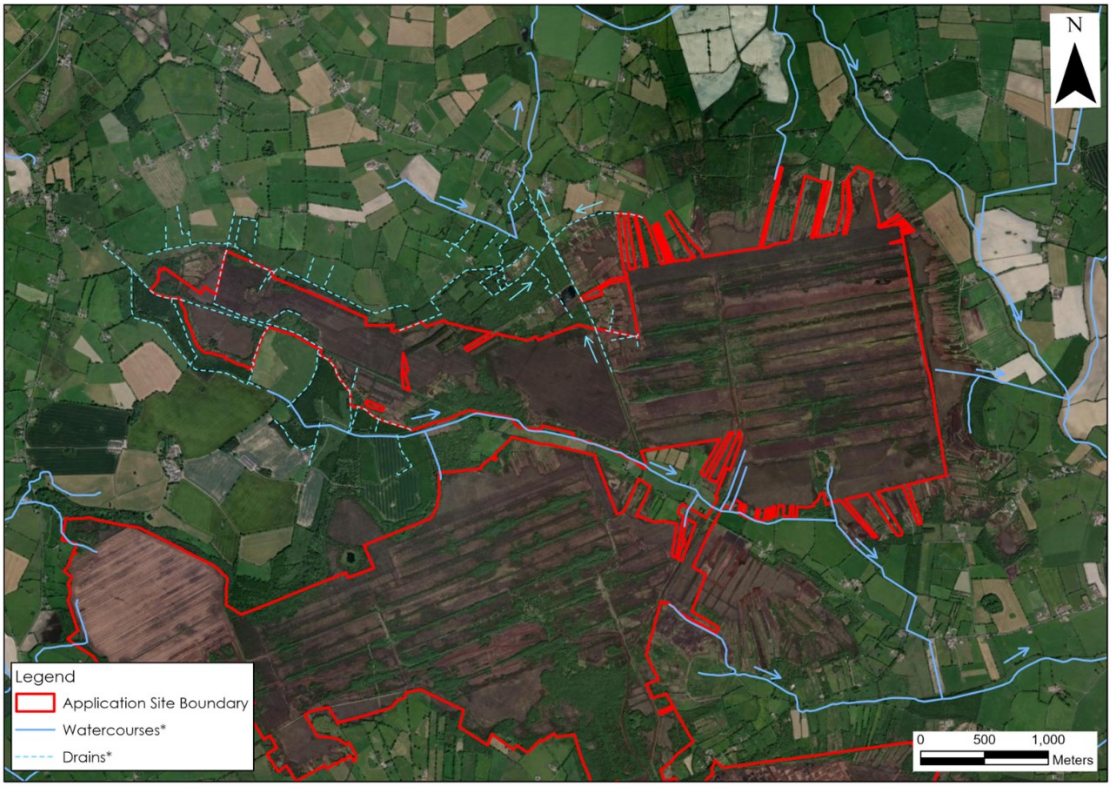


Figure 8-4: True Drainage of Lisclogher Bog Based on Site Walkovers and Lidar Data

Data on volumetric flow exceedance was acquired from OPW gauging stations (www.waterlevel.ie) within various river channels within the River Boyne catchment. The data was acquired for the main channels within the catchment, as well as in smaller tributaries of those rivers, such as the Ballivor River near Ballivor Bog. These data from the OPW include observed flows and are displayed as exceedance flows. A 95%ile flow relates to the flow which will be exceeded within the river 95% of the time *i.e.* a 95%ile flow of 1 m^3/s would indicate that 95% of the time, the flow in that river is at or above 1 m^3/s.

These data were plotted for the Boyne catchment and are displayed graphically as Figure 8-5. At some gauging stations, only 50% and 95% exceedance flows are available. The graph is annotated with zones that relate to the scale of the river flows within the overall channel.

Data from Ballivor River provides an example of flow volumes in small streams and bog outfalls within the Boyne catchment. Flows in the Ballivor River range from 0.01 – 0.1m^3/s. These flow volumes would be typical of the small streams located in the vicinty of the Application Site. Further downstream, the flow volumes increase in larger rivers such as the Deel and Stonyford rivers. For example, the 50%ile flow in the Deel River at Raharney is ~4m^3/s. Flow volumes increase further in the main Boyne River further downstream of the Application Site. For example the 50%ile flow in the River Boyne downstream of the site at Trim is ~24m^3/s.

This data highlights the variable flow volumes in river waterbodies located in the vicinity and downstream of the Application Site. Flow volumes increase progressively from small stream scale flows (0.01 – 0.1m^3/s) in the vicinity of the site, to river basin scale flows (~0.5 – 2.5m^3/s) and sub-catchment scale flows (10 - 100m^3/s) furthern downstream. Therefore the waterbodies in the vicinity of the site, with smaller flow volumes, would have had the greatest potential to be impacted by historic peat extraction activities. The potential for effects decreases progressively downstream due to the dilution effect associated with increasing flow volumes and larger upstream catchment areas.

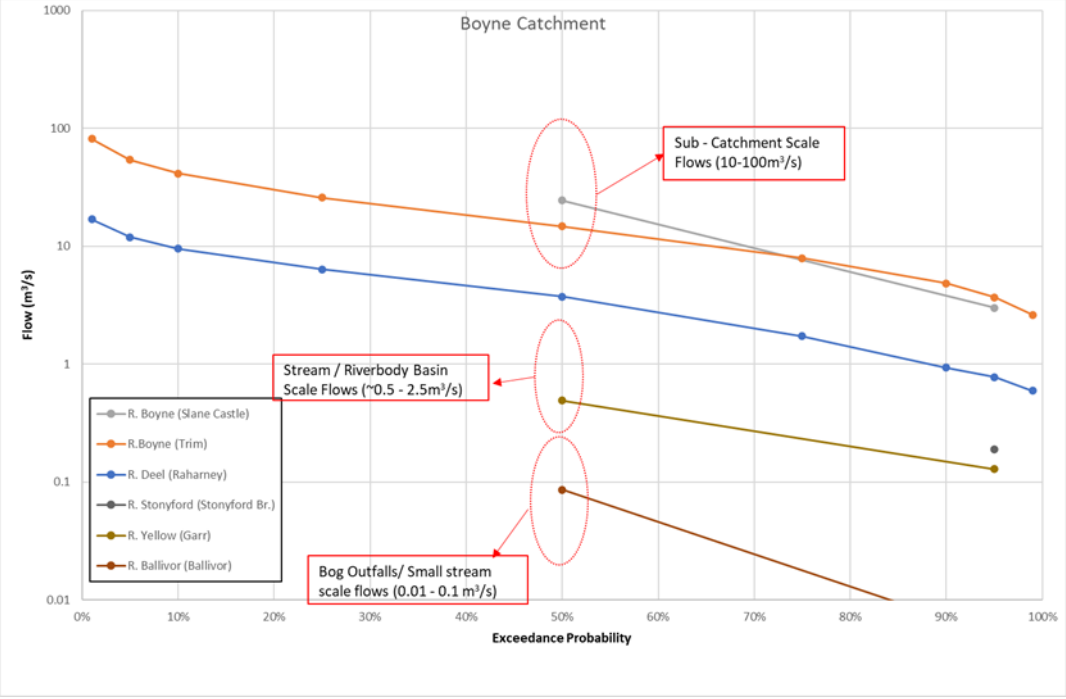


Figure 8-5: Flow Duration curves (full and partial) for rivers within the Boyne Catchment

8.4.3 Site Drainage

8.4.3.1 Pre – 1988 Bog Drainage

Table 8-5 summarises the bog areas, years of drainage and the year that peat extraction activities and all ancillary works first began in all 5 no. bogs comprising the Ballivor Bog Group.

Drainage ditches to drain the upper surface of the bogs by lowering the local water table were inserted in Lisclogher, Carranstown, Bracklin and Ballivor bogs at different stages.

The timing of initial bog drainage varies across the Application Site. Ballivor Bog was the first bog to be drained between 1948 and 1953. Clearance and drainage work commenced at Bracklin in 1952. The northern portion of Bracklin West was drained but not cleared prior to 1988. Lisclogher was drained and peat was being extracted 1960. Carranstown Bog was drained between 1974 and 1987 with only the western portion subject to peat extraction activities and all ancillary works prior to 1988. Meanwhile, drainage works were undertaken at Lisclogher West between 1973 and 1995, however no peat extraction activities or ancillary works has occurred in this bog.

Table 8-5: Peat Extraction Areas, Year of first drainage and Year of first extraction within the Ballivor Bog Group.

Bog Name	Bog Area (Ha)	Site Preparation Works including drainage insertion (Year)	First Extraction (Year)
Ballivor	638	1948 – 1953	1953
Carranstown	304	West: 1974 – 1987 –East: Drainage between 1974 – 1987, clearance postdating 1989 - 1995	West: Prior to 1988 (western side) East: Prior to 1995
Bracklin	772	Main Bracklin Bog Area: 1952 – 1958 Bracklin west: drained prior to 1988, vegetation clearance in southern portion only by 1988	Main Bracklin Bog Area: 1959 Between 1989 and 1995 at northern portion of Bracklin West By 1988 in southern portion of Bracklin West
Lisclogher	479	1955-1959	1960
Lisclogher West	228	1973-1995	No Extraction

Drainage Design

The drainage design comprised the insertion of parallel surface water drains, created by machine excavators, at intervals of 15m. Vegetation was then stripped from the bog between these drains to form the peat production fields. The drains were first opened by towing a plough cutting 50cm deep by turning the sod over and as a result, the surface water was removed. After one year the drains were deepened and the spoil removed. This step was repeated for a period of 5-7 years until a stable drain approx. 1.5m deep was established. The fields were then chambered to facilitate rainwater run-off and prevent standing water on the production fields. The drains generally fall towards the headland which is located at both ends of each production field. This headland allows for the plant such as harrowers, millers or ridgers to turn from one field into the next field. The open drains are generally piped across the end of each production field to facilitate peat extraction activities and all ancillary works plant and machinery to travel from field to field. The drainage network continues by either open channel or pipe to a silt pond or ponds prior to discharging from the Applicant's site to a local watercourse. The

Application Site was primarily drained via gravity however 2 no. pumps were located at the margins of Ballivor Bog.

Silt Ponds

Following the establishment of the Applicant's silt committee in the 1970s (included as Appendix 4-6 of this rEIAR) it was concluded that surveys should be carried out at the Application Site to select silt pond locations. Silt ponds are utilised to trap sediment and prevent elevated levels of suspended sediment arising in effluent from drained peatlands. At this time, it was agreed that silt ponds should be included in the development plans for any new areas of bog from which peat was extracted. The first silt ponds were constructed at the Application Site in 1983/1984, with these ponds being designed with an upper limit of 100mg/l of silt runoff (determined by an An Bord Pleanála (the Board) decision regarding effluent at Littleton Bog (refer to Appendix 4-8). The design of silt ponds is detailed in Section 4.3.5.9, with silt ponds typically being 8m in width, 1.5m deep and of variable length. In some locations, baffles have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. The inlet and outlet pipes at the silt ponds control the flow velocity, with velocity within the silt pond being less than 0.1m/s. Silt ponds are cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points.

8.4.3.2 1988 Baseline Bog Drainage

By 1988 (and the transposition of the EIA Directives into Irish Law), manmade drainage ditches existed across much the Application Site. In essence, the major changes from a hydrological perspective occurred within these bogs during their initial drainage, prior to 1988. Consequently, no major hydrological changes would have occurred following the initial drainage apart from minor alteration of drainage ditches as peat extraction activities and all ancillary works progressed.

Inspection of satellite imagery and annual reports reveal that Ballivor Bog was undergoing sod and milled peat extraction by 1988. The associated drainage to facilitate peat extraction activities and all ancillary works was already in situ, with field drains predominantly in a northwest-southeast orientation. The bog included 7 no. artificial silt ponds, and 7 no. surface water emission points which remain *insitu* today and two pumps were in operation at this time.

By 1988, the majority of peat extraction activities and all ancillary works had ceased at Bracklin Bog except for Bracklin West which continued to undergo milled peat extraction in the southern portion only. Drainage was already inserted by this time. The bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *insitu* today. Bracklin and Bracklin West were drained by gravity and there was no requirement for pumps.

Aerial imagery indicates that drainage and extraction for milled peat was underway in the western portion of Carranstown Bog in 1988. By this time, the eastern portion of Carranstown was drained but had not been cleared. This section of the bog included 5 no. artificial silt ponds, and 4 no. surface water emission points which remain *insitu* today.

By 1988, the centre of Lisclogher Bog had been drained and sod peat extraction was underway. No silt ponds or surface water emission locations were present at this time (the Applicant's records indicate that 6 no. silt ponds were in place before 1999). The Applicant's records also indicate that a pump was being used at Lisclogher bog. This pump was decommissioned ~20 years ago. The installation of main drainage in small areas of Lisclogher West commenced in 1973, as evidenced by aerial imagery. Aerial imagery from 1988 indicated that drainage installation was ongoing by 1988 and no extraction was taking place Table 8-6 below.

Table 8-6: 1988 Baseline Drainage

Bog Name	Drainage Status	No. Silt Ponds	No. Surface Water Discharge Locations	No. Pumps
Ballivor	Drainage already inserted	7	7	2
Carranstown	Drainage already inserted in Carranstown West No drainage in Carranstown East	5	4	-
Bracklin	Drainage inserted	6 in Bracklin West	5	-
Lisclogher	Drainage inserted	1	1	1
Lisclogher West	Drainage partially inserted	N/A	N/A	N/A

8.4.3.3 Peat Extraction Phase Drainage (July 1988 – June 2020)

By 1988, drainage had already been inserted at Ballivor, Bracklin, Lisclogher, Lisclogher West and Carranstown Bog. By 1995 all bogs within the Application Site had been drained.

Drainage of the bogs including silt pond locations and drainage outfalls are detailed in full in Section 8.4.3.4 below.

Silt Ponds

Several changes to the on-site bog drainage system occurred during this phase of the development. These changes were predominantly associated with silt ponds and attempts to reduce the concentrations of suspended sediment being discharged from the bog drainage systems to local surface watercourses. Upgrades to silt ponds were undertaken at the Application Site in the 1990s following the Harkins Internal Bord na Móna Report (1990) which highlighted the issue of elevated suspended sediment concentrations in discharge from the bog drainage network. The report revealed that a total of ~50m^3 of sludge per hectare of bog was being discharged to nearby surface watercourses every year (refer to Chapter 4). Following this, the silt ponds were designed to cater for the settling of sufficient amounts of silt providing the ponds were de-sludged at least twice per annum. A second pond was installed adjacent to the first to facilitate desludging (i.e., used as a backup when the first pond reached silt storage capacity and underwent desludging). During the Peat Extraction Phase a total of 25 no. silt ponds were installed across the 5 bogs to reduce the flow rate of drainage waters thereby allowing peat particles within the surface water to run-off and settle.

Since 2000, the bog drainage network has been operating in accordance with an Integrated Pollution Control licence (Reg. P0501-01), with all drainage water from bog units in the licensed area discharged via an appropriately designed silt pond treatment arrangement. The silt ponds serving operation bogs have been sized in accordance with a condition in the existing Integrated Pollution Control Licence (P0501-01) which states:

> *'Within three years of date of grant of this licence all existing silt ponds serving operational bogs shall achieve the following minimum performance criteria (flood periods excepted):*
>
> *Maximum flow velocity < 10 cms-1*

Silt design capacity of lagoons, minimum 50m^3 per nett ha of bog serviced'

Silt ponds were generally designed and constructed with a width of 8 metres, however, in some cases, silt ponds are up to 12 metres in width. Silt ponds of 12m width are only provided in areas where access is available to both sides of the silt ponds for cleaning. The length of the silt pond will vary depending on the capacity required (i.e. proportional to the area of catchment being drained). In some locations, baffles have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. Silt ponds are generally excavated to a depth of 1.5 metres below the pipe invert level, however in some locations, due to restricted space, the silt pond depth is greater than this. Low-velocity flow through the silt pond is generally controlled by inlet and outlet pipes at the silt ponds or upstream of the silt pond. These pipes control the velocity of the flow into and out of the silt ponds so that the velocity within the silt pond itself is less than 0.1 m/sec. The silt ponds are usually cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points. A surface water outflow map which formed part of the EPA application recorded a total of 25 no. silt ponds across the Application Site (7 no. silt ponds in Ballivor, 6 no. silt ponds in both Bracklin and Lisclogher West, 5 no. ponds in Carranstown and 1 no. pond in Lisclogher Bog).

8.4.3.4 Decommissioning and Rehabilitation Phase Drainage (June 2020 – Present Day)

Detailed hydrological audit of flow paths from each bog to its eventual discharge point at the regional catchment scale was conducted for the 5 no. bogs. The flow paths have been traced using the River Waterbodies classification as outlined by the WFD. The flowpaths for as shown as Figure 8-6 to Figure 8-10 below. These flowpaths were also in operation during the Peat-Extraction Phase described above.

Drainage from the Ballivor Bog discharges through 6 no. outfalls (SW35, SW38, SW39, SW40, SW41 and SW41A) (refer to BNM-ECO-02-SP01: Sampling Points included in the Cutaway Bog Decommissioning and Rehabilitation Plan for Ballivor Bog, see Appendix 4-2). In the southwest of Ballivor Bog, SW41A discharges to Clondalee_More stream which in turn discharges to the Deel[Raharney] River. These waterbodies are mapped within the Deel(Raharney)_060 river waterbody. Further downstream, the Deel River discharges into the Boyne_050 river waterbody. The SW35, SW38 and SW39 outfalls, located in the northeast of the bog, discharge to several unnamed drains/streams, which then discharge to the Ballivor River. In the southeast of the bog outfalls SW40 and SW41 discarge to the Derryconor stream, which then discharges to the Ballivor River. The Ballivor River is mapped within the Boyne_060 river waterbody. The Ballivor River then reaches a confluence with the River Boyne (Boyne_060). The River Boyne then continues through segments Boyne_070 to Boyne_180 before becoming tidal in the Boyne Estuary to the west of Drogheda.

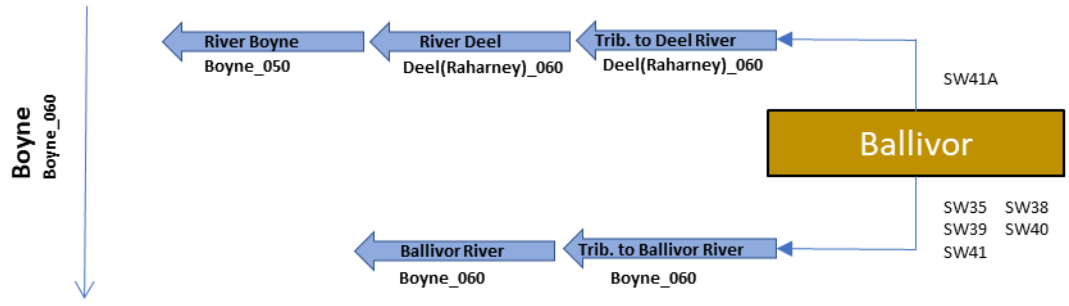


Figure 8-6: Hydrological Flow Path for Ballivor Bog

Drainage from the Carranstown Bog discharges via 4 no. outfalls (SW31, SW32, SW33 and SW34) (refer to BNM-DR-23-20-13: General Drainage Map included in the Cutaway Bog Decommissioning and Rehabilitation Plan for Carranstown Bog). In the west, SW31 discharges to the Grange More stream which in turn discharges to the Craddanstown stream before discharging into the

Deel[Raharney] River to the southwest of Ballivor Bog. These waterbodies are mapped within the Deel(Raharney)_060 river waterbody. The Deel River discharges into the Boyne_050 river waterbody. In the southeast of the bog, the SW33 ans S34 discharge to the Killaconnigan stream, which in turn discharges to the Ballivor River southwest of Ballivor village. Here the Ballivor River is mapped within the Boyne_060 river waterbody. In the northeast, SW32 outfalls to the Craddanstown Little stream which discharges into the Cartenstown stream and eventually the Stonyford River to the east of the bog. These waterbodies are mapped within the Stonyford_040 river waterbody. Further downstream the Stonyford River reaches a confluence with the River Boyne (Boyne_070). The River Boyne then continues through segments Boyne_080 to Boyne_180 before becoming tidal in the Boyne Estuary to the west of Drogheda.

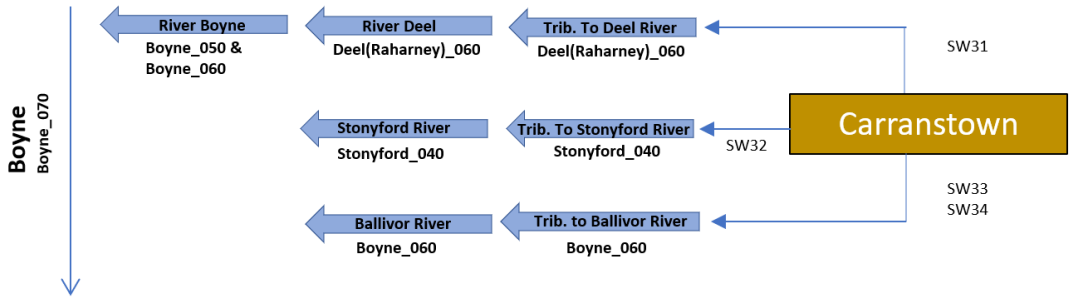


Figure 8-7: Hydrological Flow Path for Carranstown Bog

Drainage from the Bracklin Bog discharges via 5 no. outfalls (SW26, SW27, SW28, SW29 and SW30), with all outfalls being located in Bracklin West (refer to BNM-ECO-03-02: Strcutures and Sampling Map included in the Cutaway Bog Decommissioning and Rehabilitation Plan for Bracklin Bog). SW28, SW29 and SW30 discharge to the Greenan stream and the Ballynaskeagh stream respectively before discharging into the Deel River. These waterbodies are mapped in the Deel(Raharney)_030 river waterbody. The Deel River continues through segments Deel(Raharney)_040 and Deel(Raharney)_050. SW26 and SW27 outfall to the Craddanstown stream which forms part of the Deel(Raharney)_060 river waterbody. The Deel River discharges into the Boyne_050 river waterbody. The River Boyne then continues through segments Boyne_060 to Boyne_180 before becoming tidal in the Boyne Estuary to the west of Drogheda.

A small lake waterbody, referred to as Bracklin Lough is located to the north of Bracklin Bog and is visible in Figure 8-13.

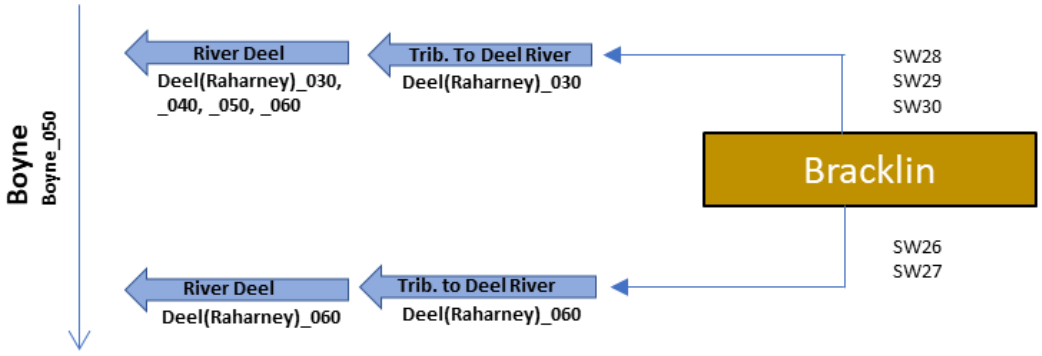


Figure 8-8: Hydrological Flow Path for Bracklin Bog

Beyond areas of third-party peat extraction activities and all ancillary works in the northeast (which ceased in 2020), Lisclogher Bog has not been subject to peat extraction activities and all ancillary works since the 2003 and has become overgrown with the Applicants Cutaway Bog Decommissioning and Rehabilitation Plan for Lisclogher East Bog (2022) stating that the drainage system is beginning to break down with many drains becoming blocked and filling with water. Drainage from Lisclogher Bog

discharges via 1 no. outfall (SW25) located in the northeast of the bog (refer to BNM-ECO-01-SP01: Sampling Points Map included in the 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan for Lisclogher Bog, see Appendix 4-2). SW25 discharges to an unnamed stream which in turn discharges to the Stonyford River. These waterbodies are mapped in the Stonyford_030 river waterbody. The Stonyford River continues through the Stonyford_040 waterbody before discharging into the Boyne_070 waterbody.

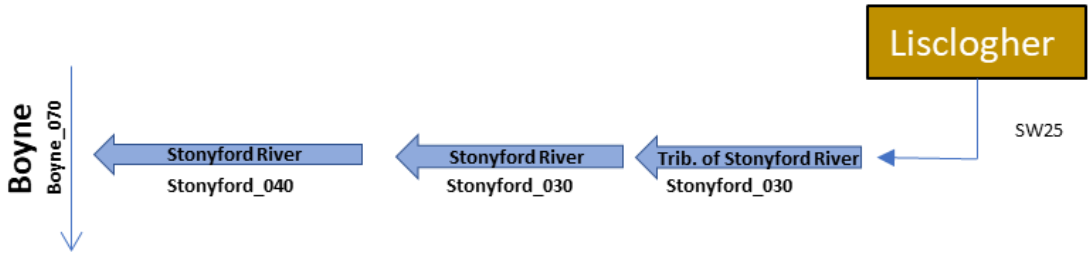


Figure 8-9: Hydrological Flow Path for Lisclogher Bog

While Lisclogher West was never subject to peat extraction activities and all ancillary works, ditches and drains were constructed between 1973 and 1995. Drainage from Lisclogher West discharges via 6 no. outfalls (SW19 – SW24) located along the southern boundary of the bog (refer to BNM-ECO-04-SP01: Sampling Points Map included in the 2023 Cutaway Bog Decommissioning and Rehabilitation Plan for Lisclogher West, see Appendix 4-2). These outfalls discharge to the Bolandstown stream which in turn discharges to the Cartenstown stream and then the Stonyford River. These waterbodies are mapped in the Stonyford_040 river waterbody. The Stonyford River discharges into the Boyne_070 waterbody approximately 5km southeast of the Ballivor village.

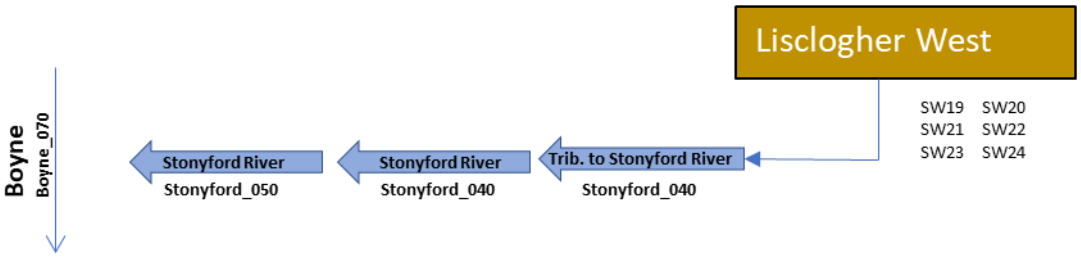


Figure 8-10: Hydrological Flow Path for Lisclogher West

The flowpaths outlined above were used in the assessment of any impacts between the surface water hydrological regime and the bog hydrogeological regime for both the Peat Extraction Phase and the Remedial Phase. It is assumed that due to the very high surface water runoff rates and very low groundwater recharge rates at the site there is a connection between the near surface groundwater at the bogs, which likely discharges to surface waterbodies.

During the Remedial Phase, the drainage system at the Ballivor bogs continued in accordance with IPC Licence conditions.

Drainage maps for each of the bogs are shown in Figure 8-11 to Figure 8-16 and include the locations of silt ponds.

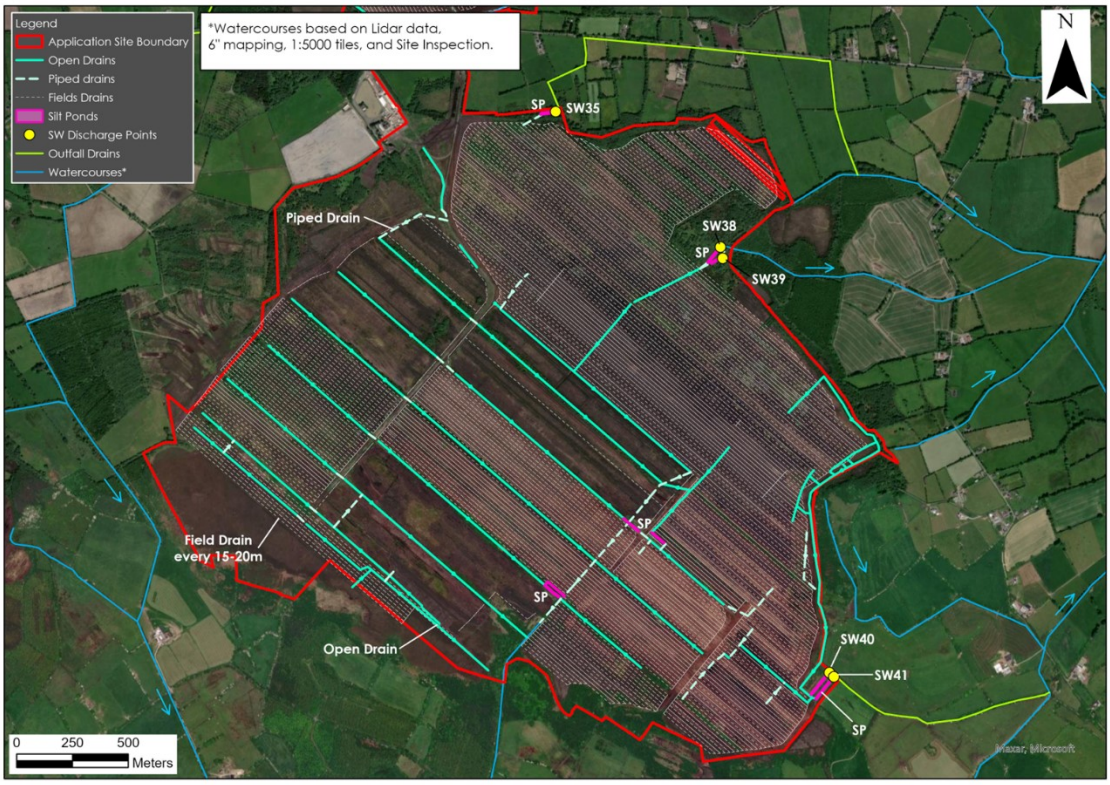


Figure 8-11: Internal Drainage Map - Ballivor Bog

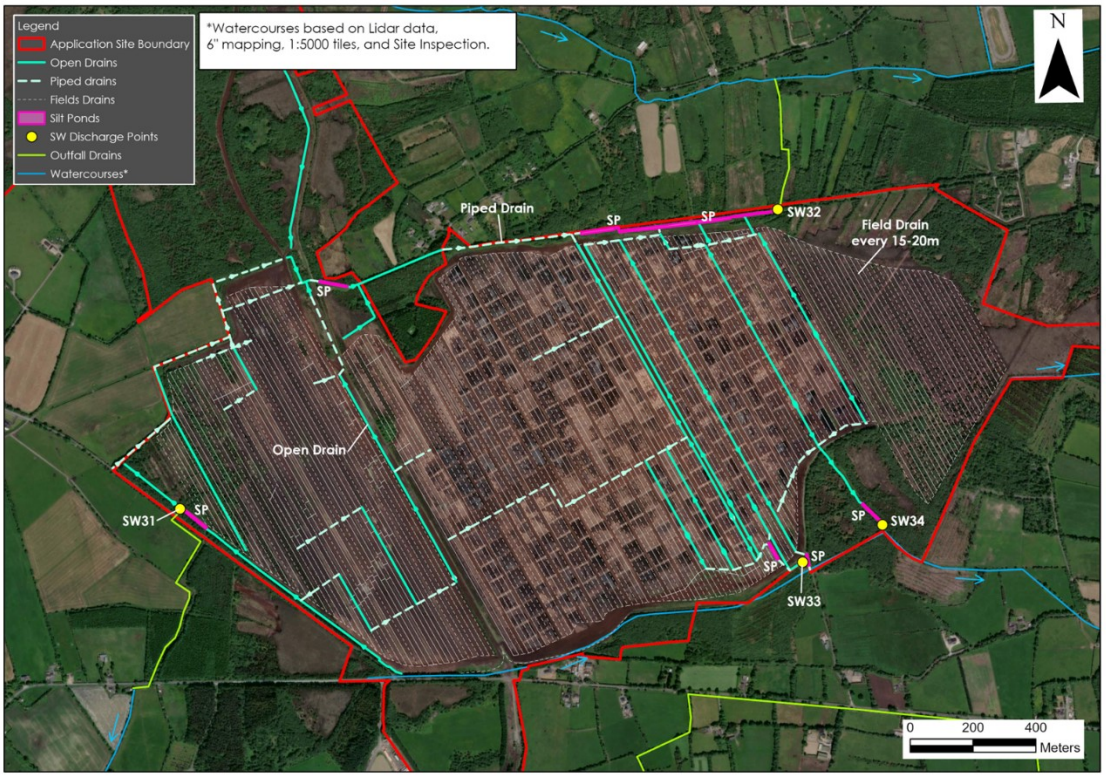


Figure 8-12: Internal Drainage Map - Carranstown Bog



Figure 8-13: Internal Drainage Map - Bracklin Bog



Figure 8-14: Internal Drainage Map – Bracklin West



Figure 8-15: Internal Drainage Map – Lisclogher Bog

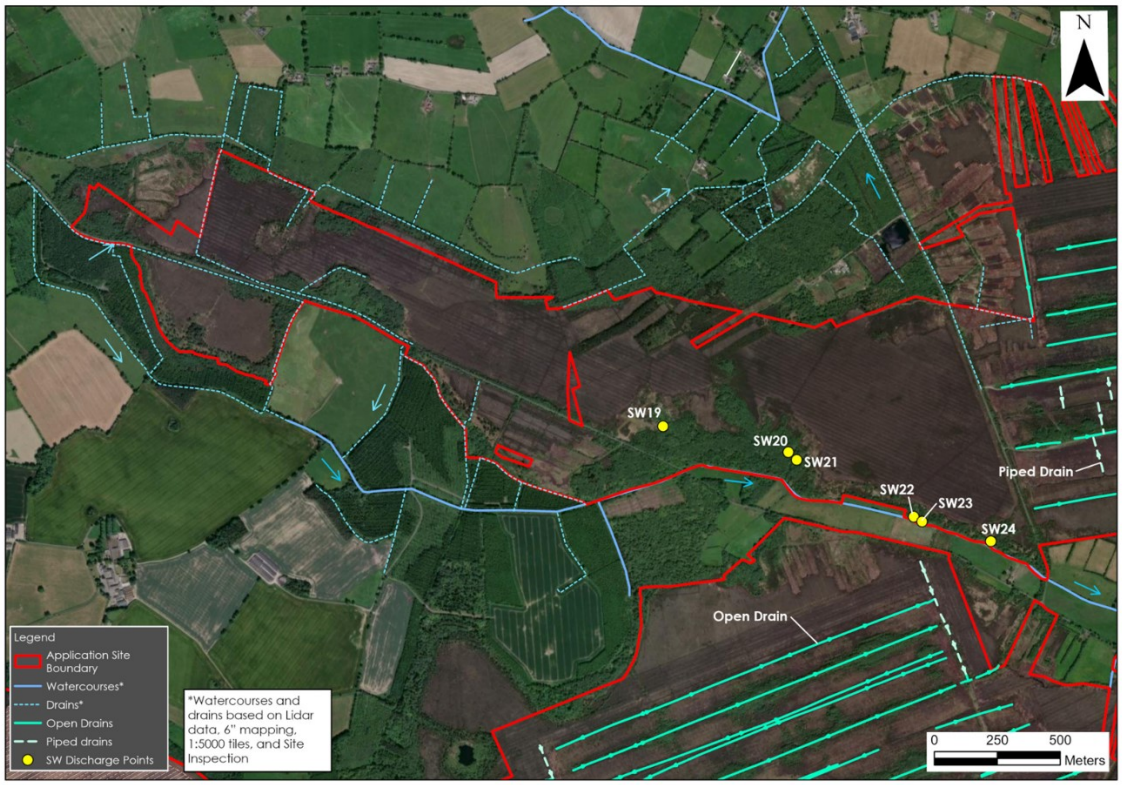


Figure 8-16: Internal Drainage Map – Lisclogher West Bog

8.4.4 Flood Risk Assessment

This section presents an overview of the flood risk assessment undertaken for the Ballivor Bog Group. The full flood risk assessment report is provided in **Appendix 8-1**.

To identify those areas as being at risk of flooding, OPW's indicative river and coastal flood map (www.floodmaps.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie) and historical mapping (i.e. 6" and 25" base maps) were consulted.

No recurring flood incidents or instances of historical flooding were identified within the Application Site in historic OS maps or in OPW flood maps. Identifiable map text on local available historical 6" or 25" mapping for the Application Site does not identify any lands that are "liable to flood".

The Application Site is found to lie outside of the OPW's indicative river and coastal flood zones. In addition, the GSI Groundwater Flood mapping does not record any groundwater flood zones with the Application Site.

The Local Authority Strategic Flood Risk Assessment (SFRA) mapping indicates that areas in the northwest of Lisclogher Bog are vulnerable to fluvial flooding. However, site walkover surveys have revealed an error in the EPA map of local rivers. The EPA map (www.epa.ie) shows the Cartenstown stream to flow from Lisclogher West to the southeast, crossing Lisclogher Bog. Site walkovers have revealed that this section of the river does not exist, with Lisclogher West draining to the north. Such small (local) errors are infrequent in EPA mapping; however, they do exist especially where manmade drainage has been imposed upon natural drainage regimes. This error casts doubt on the validity of the SFRA flood zones in this area as the flood zones assume the presence of a surface watercourse.

CFRAM mapping includes modelled flood levels for the 10-year and 100-year flood events. These levels, modelled near Ballivor village, range from 64.19 – 65.34m OD and are well above the current outfall pipe elevations at the Application Site. Therefore, the risk of fluvial flooding along the Ballivor River, located to the east of the Application Site, backing up into the site drainage network is very low.

The main risk of flooding across much of the Application Site is via pluvial flooding due to the low permeability peat soils and subsoils. The surface of the cutover bog contains an extensive network of peat drains with surface water outflows from the bogs. This existing drainage network has reduced the risk of pluvial flooding across much of the site. However, following periods of intense and prolonged rainfall events localised surface water ponding is still likely to occur in places.

Based on existing topography there is significant storage within each of the bog basins to alleviate any flood risk associated with pluvial flooding. This storge of rainwater after rainfall events will not generate any additional offsite flood risk.

8.4.5 Surface Water Quality

8.4.5.1 EPA Biological Q-Rating Monitoring

The Biological Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High).

8.4.5.1.1 *Pre-1988 EPA Q-Ratings*

EPA Q-rating monitoring (i.e. biological monitoring data) of river waterbodies began in the early 1970s. Historic Q-data is available from 1971 to 1986 for the Deel (Raharney), Stonyford and Boyne Rivers in the vicinity and downstream of the Application Site. Table 8-7 shows that the historic Q-values ranged from Q3 ('Poor' Status) to Q5 ('High' Status) during this time period.

Table 8-7: EPA Q-Rating Status (Pre-1988)

River	Station ID	Location	EPA Q-Rating (Years)	Q-Value Status Range	
Deel (Raharney)*	RS07D010100	Bridge upstream Cummer Bridge	3.5 (1982 - 1985)	Moderate	
Deel (Raharney)	RS07D010200	Cummer Bridge	4-5 - 5 (1971-1985)	High	
Deel (Raharney)	RS07D010300	Raharney Bridge	4-5 – 5 (1976 - 1985)	High	
Deel (Raharney)	RS07D010400	Inan Bridge	4-5 - 5 (1971 - 1985)	High	
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4 - 5 (1971 - 1985)	Good (1978)	High (1985)
Boyne	RS07B040800	Inchamore Bridge	3 – 4-5 (1974 - 1986)	Poor (1974)	High (1986)
Boyne	RS07B040900	Scariff Bridge	3.5 - 5 (1974 - 1986)	Moderate (1974)	High (1986)
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	4 (1981 - 1985)	Good	
Stonyford	RS07S020200	Earl's Bridge	4 – 4.5 (1976 - 1985)	High (1976)	Good (1985)
Stonyford	RS07S020300	Shanco Bridge	4 (1981 - 1985)	Good	
Stonyford	RS07S020400	Stonyford Bridge	4 – 4.5 (1976 - 1985)	Good (1985)	High (1976)
Boyne	RS07B041000	Derrinydaly Bridge	4 - 5 (1974 – 1986)	Good (1979)	High (1986)

8.4.5.1.2 *1988 Baseline EPA Q-Ratings*

No Biological Q-rating data is available for 1988 due to the fact that no EPA monitoring was completed during this calendar year. However, EPA Q-rating monitoring was completed on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the Application Site in 1985 and 1986.

This historic data, listed in Table 8-8, shows that the Deel (Raharney), Stonyford and Boyne rivers downstream of the Application Site were of 'Good' or 'High' Q-value status in 1988. Meanwhile upstream of the Application Site, the Deel(Raharney) River achieved 'Moderate' status upstream of Cummer Bridge (Station Code: RS07D010100). However, all 5 no. monitoring stations downstream of the Application Site on the Deel (Raharney) River achieved 'High' Q-value status (Station Code: RS07D010200 – RS07D010600). To the east and downstream of the Application Site the Stonyford

River was of 'Good' status (Station Code: RS07S020100 - RS07S020400). The Boyne River achieved 'Good' Q-value status downstream of its confluence with the Deel (Raharney) river (Station Code: RS07B040800) and 'High' Q-rating status downstream of its confluence with the Stonyford River (Station Code: RS07B041000).

Table 8-8: Baseline (1988) Q-ratings

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Deel (Raharney)*	RS07D010100	Bridge upstream Cummer Bridge (upstream of Application Site)	3.5 (1985)	Moderate
Deel (Raharney)	RS07D010200	Cummer Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010300	Raharney Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010400	Inan Bridge	5 (1985)	High
Deel (Raharney)	RS07D010500	Clondalee Bridge	4-5 (1985)	High
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4-5 (1985)	High
Boyne	RS07B040800	Inchamore Bridge	4-5 (1986)	High
Boyne	RS07B040900	Scariff Bridge	5 (1986)	High
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	4 (1985)	Good
Stonyford	RS07S020200	Earl's Bridge	4 (1985)	Good
Stonyford	RS07S020300	Shanco Bridge	4 (1985)	Good
Stonyford	RS07S020400	Stonyford Bridge	4 (1985)	Good
Boyne	RS07B041000	Derrinydaly Bridge	5 (1986)	High

8.4.5.1.3 EPA Q-Ratings during Peat Extraction Phase (1988-2020)

EPA Q-rating monitoring has been completed at several dates and at multiple locations on the Deel (Raharney), Stonyford and Boyne rivers in the vicinity and downstream of the Application Site between 1988 and 2020.

Historic Q-values for the Deel(Raharney) River are shown in Table 8-9 and Figure 8-17. The Deel (Raharney) River receives drainage from Bracklin and Ballivor bogs as outlined above. Of the monitoring locations situated downstream of the Application Site, 'High' status was not achieved after 1990. The Deel (Raharney) River achieved 'High' status downstream of the Application Site and upstream of its confluecne with the River Boyne in 1990 (Station Code: RS07D010600). The lowest Q-value assigned to the Deel(Raharney) River downstream of the Application Site occurred at Raharney Bridge in 2003 when it achieved 'Poor' status (Station Code: RS07D010300). Generally however the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during the Peat Extraction Phase.

For comparison the Q-ratings of the Deel (Raharney) River upstream of the Application Site have also been investigated. While the Deel (Raharney) River achieved 'High' status in 1997 near Mabestown (Station Code: RS07D010070), no significant disparities exist between the recorded Q-values at these monitoring stations and those in the vicinity and downstream of the site.

Table 8-9: Summary of Q-Ratings on the Deel(Raharney) River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07D010070	Bridge west of Mabestown (upstream of site)	255870	265493	1990 - 2020	3.5 – 4.5
RS07D010090	Bridge upstream of Lough Analla (upstream of site)	256495	262448	1990 – 2003	3 - 4
RS07D010100	Bridge upstream of Cummer Bridge (upstream of site)	257915.83	260230.25	1985 - 1990	3.5 – 4.5
RS07D010200	Cummer Bridge	258458	257621	1985 – 2020	3.5 – 4
RS07D010300	Raharney Bridge	260085	253021	1985 - 2020	3.5 – 4
RS07D010400	Inan Brodge	263452	250407	1985 - 2020	3.5 – 4
RS07D010600	Bridge upstream of confluence with Boyne River	269031	249313	1985 - 2020	3.5 - 4

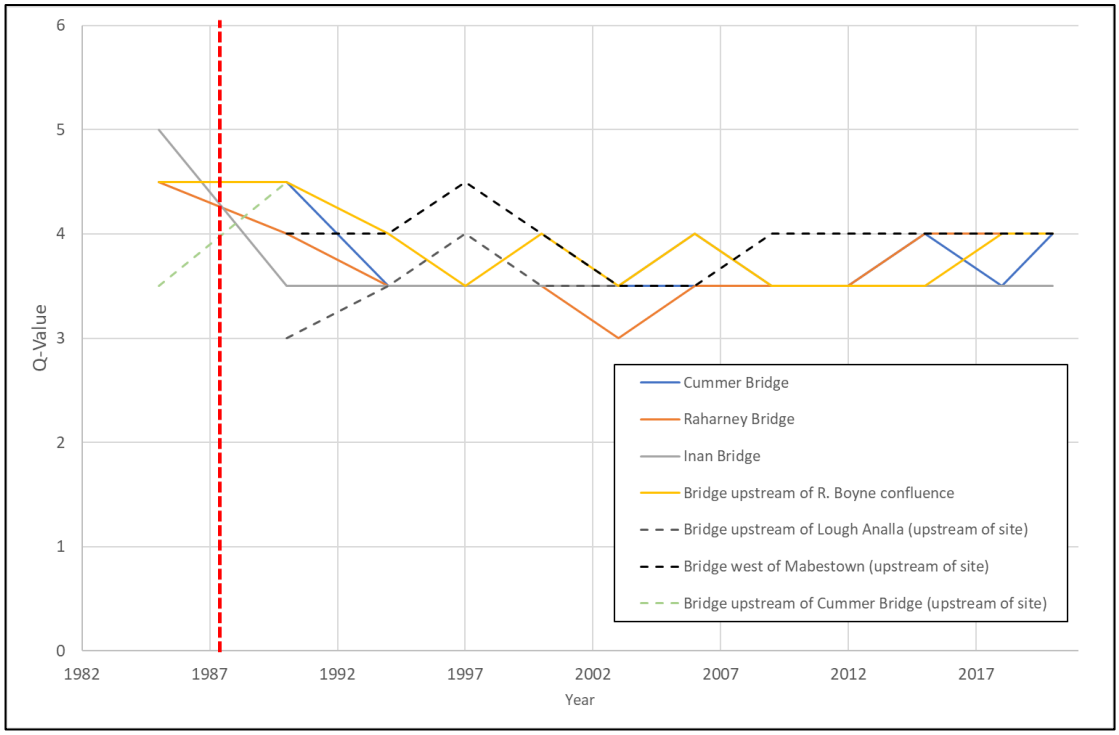


Figure 8-17: Biological Q-Rating Changes on the Deel (Raharney) River during the Peat Extraction Phase (1988 – 2020)

Historic Q-values for the Stonyford River are shown in Table 8-10 and Figure 8-18. The Stonyford River recieves discharge from Lisclogher, Lisclogher West, Bracklin and Carranstown bogs. Of the monitoring locations situated downstream of the Application Site, 'High' status was not achieved at any date duting the Peat Extraction Phase. The lowest Q-value assigned to the Stonyford River downstream of the site at Stonyford Bridge (Station Code: RS07S020075) and at a bridge near Rathkenna (Station Code: RS07S020100) which both achieved 'Poor' status in 2020. Generally however the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during the Peat Extraction Phase.

For comparison the Q-ratings on the Stonyford River upstream of the Application Site have also been investigated. The Q-ratings at these upstream locations are comparable to those located downstream of the Application Site and no significant disparities exist.

Table 8-10: Summary of Q-Ratings on the Stonyford River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07S020065	Bridge near Ballinlough (upstream of Application Site)	262027	264264	2000 - 2020	3.5 – 4
RS07S020070	Bridge near Clonmaskill (upstream of Application Site)	262103	262562	1990 - 1997	3.5
RS07S020075	Stonestown Bridge (upstream of	263805	261681	2000 - 2020	3 – 4

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
	Application Site)				
RS07S020100	Upstream of Rathkenna Bridge	268303	257165	1981 - 1985	4
RS07S020090	Upstream of Rathkenna Bridge	267684	258139	1990 - 2003	3.5 – 4
RS07S020080	Lisclogher Bridge	265568	261131	1990 - 1997	3.5 – 4
RS07S020400	Stonyford Bridge	273148	253252	1990 - 2020	3.5 – 4.5
RS07S020300	Shanco Bridge	270561	254707	1990 - 2003	4
RS07S020200	Earl's Bridge	269403	256080	1990	4

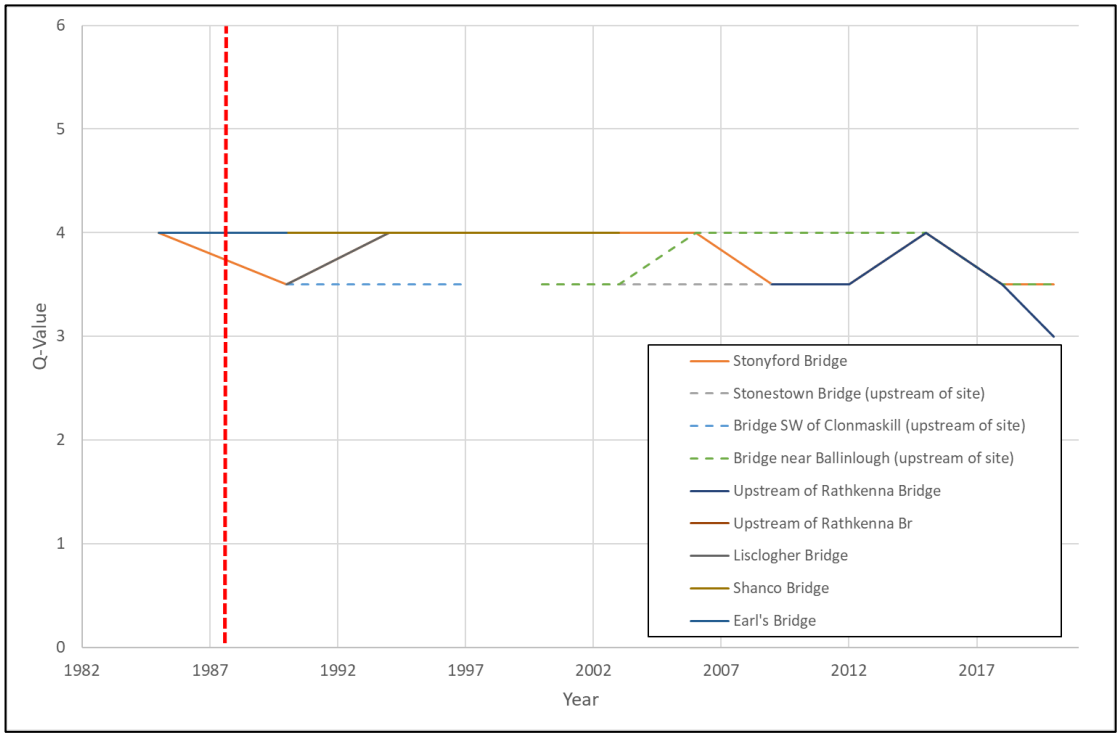


Figure 8-18: Biological Q-Rating Changes on the Stonyford River during the Peat Extraction Phase (1988 – 2020)

Historic Q-values for the River Boyne are shown in Table 8-11 and on Figure 8-19. The Boyne River recieves discharge from Carranstown and Ballivor Bogs and from the remainder of the site via the Deel (Raharney) and Stonyford Rivers. Of the monitoring locations situated downstream of the Application Site, 'High' status was achieved on 2 no. occasions at Inchamore Bridge (Station Code: RS07B040800). The lowest Q-rating status assigned to the Boyne River during the Peat Extraction Phase was 'Moderate' status. Generally the Q-ratings downstream of the Application Site have fluctauted between 'Moderate' and 'Good' Q status during this phase of the Project.

For comparison the Q-ratings of the Boyne River at Ashfield Bridge (Station Code: RS07B040600), located upstream of the confluence of the Boyne and Deel (Raharney) rivers have also been investigated. The Boyne at Ashfield achieved 'Poor' status on 2 no. occasions during this time period and did not achieved 'Good' status at any time post dating 1994.

Table 8-11: Summary of Q-Ratings on the Boyne River during the Peat Extraction Phase (1988 – 2020)

Station ID	Location Description	Easting	Northing	Available Data	EPA Q-Rating Range
RS07B040600	Ashfield Bridge	268466	244868	1990 - 2020	3 – 3.5
RS07B040800	Inchamore Bridge	271093	249913	1990 - 2020	3.5 – 4.5
RS07B040900	Scariff Bridge	273392	252679	1990 - 2020	3.5 - 5
RS07B041000	Derrinydaly Bridge	276679	253937	1990 - 2020	3.5 – 5
RS07B041100	Downstream of Athboy confluence	278039	256559	1990 - 2020	3.5 - 4

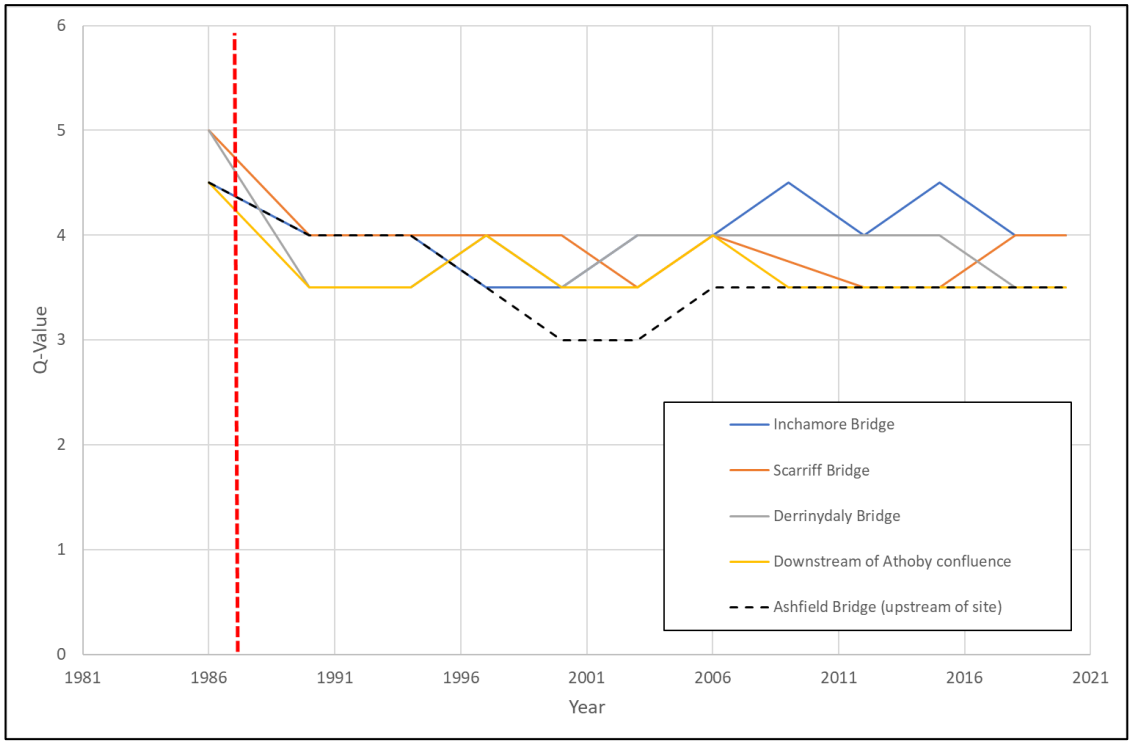


Figure 8-19: Biological Q-Rating Changes on the Boyne River during the Peat Extraction Phase (1988 – 2020)

8.4.5.1.4 EPA Q-Ratings During Current Phase (June 2020 – Present Day)

No available EPA Biological Q-rating monitoring data postdates 2020. The most recent Q-rating data for the Deel (Raharney), Stonyford and Boyne rivers is presented in Table 8-12 below. This data shows that the Q-status of the Deel (Raharney), Stonyford and Boyne rivers downstream of the Application Site ranges from 'Poor' to 'Good' status.

A total of 4 no. EPA monitoring points are available for 2020 along the Deel (Raharney) River to the west and downstream of the Application Site. Here the Deel (Raharney) River achieved a Q4 rating *i.e.* 'Good' status, at 3 no. locations (Station Codes: RS07D010200, RS07D010300 and RS07D010600) and a Q3-4 rating i.e. 'Moderate' status, at 1 no EPA monitoring location (Station Code: RS07D010400). Meanwhile to the east and downstream of the Application Site, the Stonyford River achieved 'Poor' status at 1 no. monitoring location (Station Code: RS07S020100) and 'Moderate' status further downstream (Station Code: RS07S020400). The Boyne River achieved 'Good' Q-value status downstream of its confluence with the Deel (Raharney) river (Station Code: RS07B040800 and RS07B040900) and 'Moderate' Q-rating status downstream of its confluence with the Stonyford River (Station Code: RS07B041000).

A map of EPA monitoring locations for the most recent round of monitoring is shown as Figure 8-20.

Table 8-12: Most Recent (2020) Q-ratings

River	Station ID	Location	EPA Q-Rating (Year)	Q-Value Status
Deel (Raharney)	RS07D010200	Cummer Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010300	Raharney Bridge	4 (2020)	Good
Deel (Raharney)	RS07D010400	Inan Bridge	3-4 (2020)	Moderate
Deel (Raharney)	RS07D010600	Bridge upstream of Boyne River confluence	4 (2020)	Good
Boyne	RS07B040800	Inchamore Bridge	4 (2020)	Good
Boyne	RS07B040900	Scariff Bridge	4 (2020)	Good
Stonyford*	RS07S020075	Stonestown Bridge	3 (2020)	Poor
Stonyford	RS07S020100	Bridge upstream of Rathkenna Bridge	3 (2020)	Poor
Stonyford	RS07S020400	Stonyford Bridge	3-4 (2020)	Moderate
Boyne	RS07B041000	Derrinydaly Bridge	3-4 (2020)	Moderate

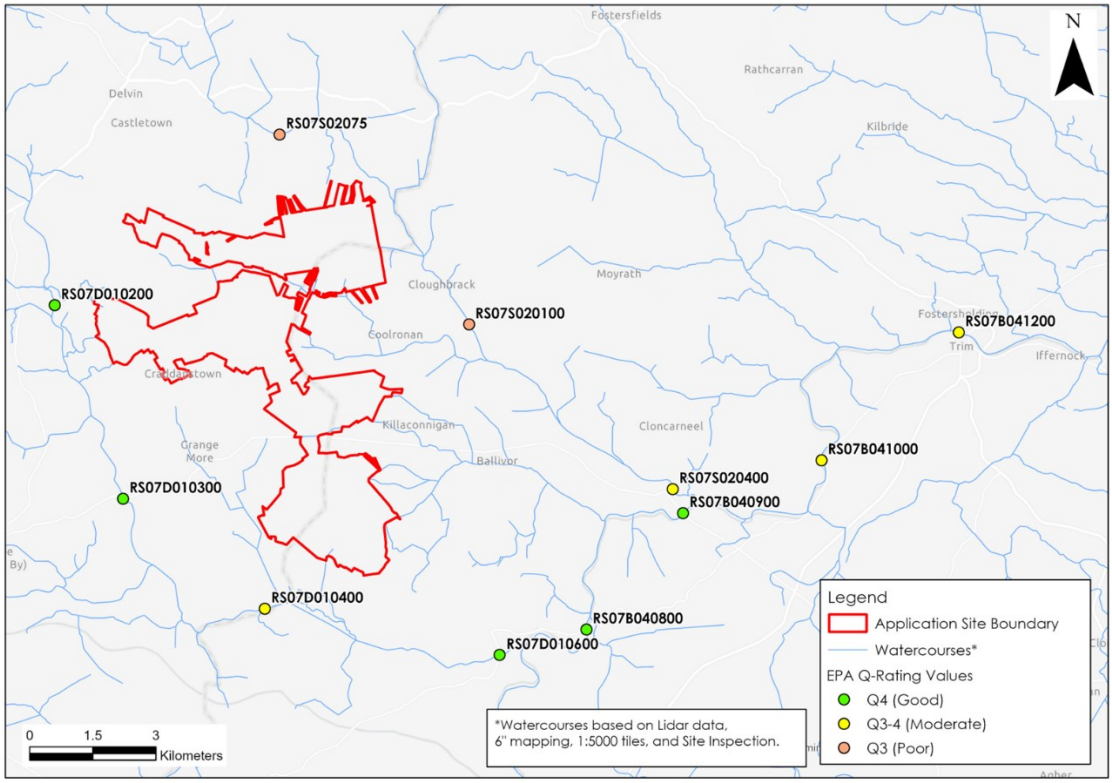


Figure 8-20: EPA Monitoring Locations

8.4.5.2 Bord na Móna Monitoring

8.4.5.2.1 *Pre - 2000*

Before the implementation of the IPC Licence requirements and associated monitoring discussed in Section 8.4.5.2.2 below, limited monitoring of surface water quality and emissions was completed at the Application Site by the Applicant.

However as discussed in Chapter 4, Section 4.7.1.1, several control measures designed to protect surface water quality were in place prior the IPC Licence. These measures related to the storage and maintenance of vehicles, refuelling procedures, the maintenance of internal drains, pumps and waste management. However, no records of surface water quality monitoring exist from this time period.

Silt ponds were constructed at the Ballivor Bogs in the mid-1980s, with no effluent control measures present before this date. These silt ponds were constructed with an upper limit of 100mg/l of suspended sediment.

8.4.5.2.2 *IPC Licence Monitoring (2000-Present)*

The Applicant has been conducting monitoring of emissions to water from the Application Site drainage system from 2000 to the present as set out in IPC Licence P0501-01 which came into effect in 2000.

Stormwater (i.e., rainwater run-off from roof and non-process areas such as carparks) derived on-site is released into a local waterbody following basic treatment. The IPC licence requires that stormwater (from roof and non-process areas such as carparks) is managed to ensure that no pollutants are released into the receiving environment. Where run-off comprises of only roof water it is directed directly to a drain. Runoff from other areas such as carparks is passed through a hydrocarbon interceptor before discharge. The waterbodies which are listed as receiving stormwater run-off at this site are the Boyne

and Stonyford rivers. Discharges (from roof and non-process areas such as carparks) are inspected and sampled on a monthly basis. The primary treatment criteria used to define adequate treatment of stormwater is COD mg/l. Monthly sampling was completed with results being generally well below the COD trigger levels. Occasionally elevated concentrations occurred when machinery had been washed down immediately prior to sampling and subsequent results returned to satisfactory levels.

The EPA licence has also required that wastewater at the Application Site be managed to ensure no pollution results when wastewaters were discharged into local surface waterbodies. Two types of wastewaters were produced at the Application Site: Process wastewater from the activities associated directly with peat harvesting operations and sanitary wastewater from toilets and canteens. All process wastewater from peat extraction activities and all ancillary works areas is treated via a silt pond drainage system which has been inspected and maintained in accordance with Condition 6 of the IPC Licence. Treated wastewater is released into the Deel(Raharney), Stonyford and Boyne Rivers. IPC Licence requirements comprise of quarterly grab samples on a select number of silt pond outlets.

Across the 5-no. bog comprising the Ballivor Bog Group a total of 244 grab samples (between 14/09/2000 and 01/12/2022) have been taken and analysed for COD, pH, Ammonia, Total Phosphorous, Suspended Solids, Total Solids and Colour. The emission limit values are 35mg/l suspended solids, 2.78mg/l total ammonia, and 100mg/l COD.

As shown in Figure 8-21, no exceedances of Ammonia (I/PV (parameter value) for A3 water is 4 mg/L) have been recorded across the Application Site. The lowest mean concentration of ammonia (0.47mg/l) was recorded in the outfalls from Ballivor Bog, while the greatest mean concentration (0.97mg/l) was recorded in outfalls from Bracklin Bog. The I/PV for A3 waters is 4mg/l and all sampling results are below this value. A total of 10 no. exceedances have been recorded above the IPC Licence trigger limit of 2.78mg/l, with 9 of these exceedances coming from outfalls from Lisclogher Bog and 1 from an outfall from Carranstown Bog. These were recorded at outfall SW31 (2.8mg/l) from Carranstown Bog in Q2 2018, and at outfall SW33 (2.8mg/l) from Carranstown Bog in Q2 2018; on 8 no. occasions at outfall SW25 from Lisclogher Bog: Q2 2014 (2.8mg/l), Q2 2015 (3.4mg/l), Q1 2018 (2.9mg/l), Q4 2019 (3.49mg/l), 2 no. occasions in Q2 2021 (2.98 – 3.15mg/l) and 2 no. occasions in Q4 2021 (2.94 – 3.38mg/l); on 1 no. occasions at outfall SW22 from Lisclogher Bog: Q2 2015 (3.4mg/l). However, it is not unusual for surface water emanating from peatlands to contain slightly elevated ammonia concentrations.

As shown in Figure 8-22, 6 no exceedances of the IPC limit for Suspended Solids have been recorded in outfalls from the Application Site. The concentrations of suspended solids typically ranged from 5-10mg/l. A total of 6 no. exceedances are reported for the period from 2000-2021 which comprised a total of 335 no. samples. These exceedances occurred at SW31 outfall from Carranstown Bog (56mg/l) in Q2 2006, at SW32 outfall from Carranstown Bog (56mg/l) in Q2 2006 and at outfall SW30 from Bracklin Bog (37mg/l) in Q4 2007. In addition, 3 no. exceedances were recorded in outfalls from Ballivor Bog in 2021 (37, 37 and 56mg/l) However as seen below, these exceedances are outliers with 75% of all data being less than or equal to 16mg/l in each bog. The mean concentration of suspended solids recorded in the outfalls from individual bog units ranges from 6.1mg/l in Bracklin to 8.3mg/l in Carranstown.

As shown in Figure 8-23, 75 no. exceedances of COD have been recorded in outfalls from the Application Site. The mean concentration of COD from each individual bog unit lies below the IPC Limit of 100mg/l. The mean concentration of COD at Ballivor, Bracklin, Carranstown and Lisclogher Bog was 89mg/l, 75mg/l, 92mg/l and 75mg/l respectively. The greatest concentrations of 440mg/l were recorded in outfall SW29 and SW30 from Bracklin Bog in Q3 2020. Reduced flow and increased temperature can influence COD concentrations.

Other parameters recorded during the sampling included Total Phosphorous and pH. Total phosphorous remained relatively stable across the 20-year monitoring period and across all bogs with concentrations ranging from 0.05 - 0.65mg/l. pH values were generally within the recommended 6 – 9 range, however, 5 no. pH recordings from outfalls in Lisclogher Bog were below the lower pH limit of

6. It is not uncommon to record low pH concentrations from peat bogs. In general, however, pH values emanating from peat extraction activities and all ancillary works areas remain relatively constant and in line with background levels.

Quarterly flow monitoring was completed at 2 no. outfall locations in Bracklin and Carranstown bogs from 2004 to 2012. Flows ranged from 0-65.7l/sec with the greatest flows observed in Q1 and Q4 responding to increased volumes of precipitation during the winter months.

With regard to the most recent AER report from 2023, all samples were compliant with respect to suspended solids and ammonia. Meanwhile, the trigger level for COD was breached on 7 no. occasions. The Aer states that there was no obvious reason for breaching these trigger levels, other than naturally occurring background concentrations of COD. All exceedances were reported to the EPA.

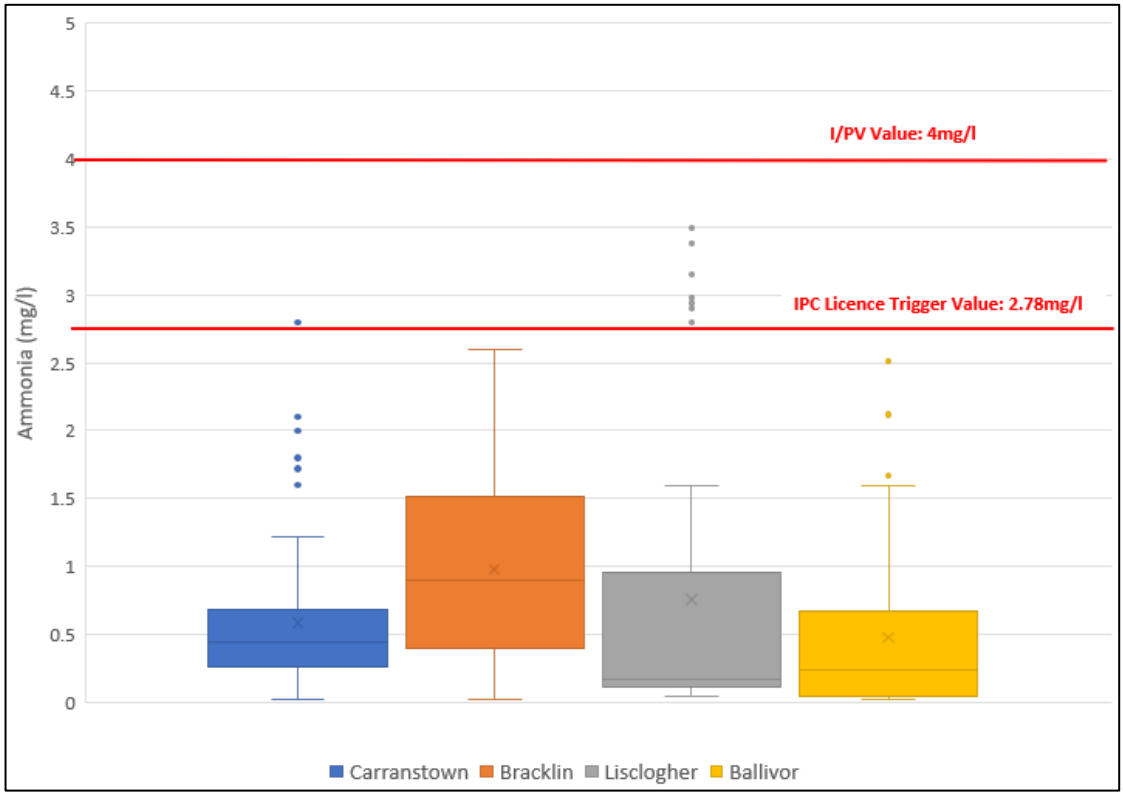


Figure 8-21: Bord na Móna Ammonia Monitoring (2000-2021)

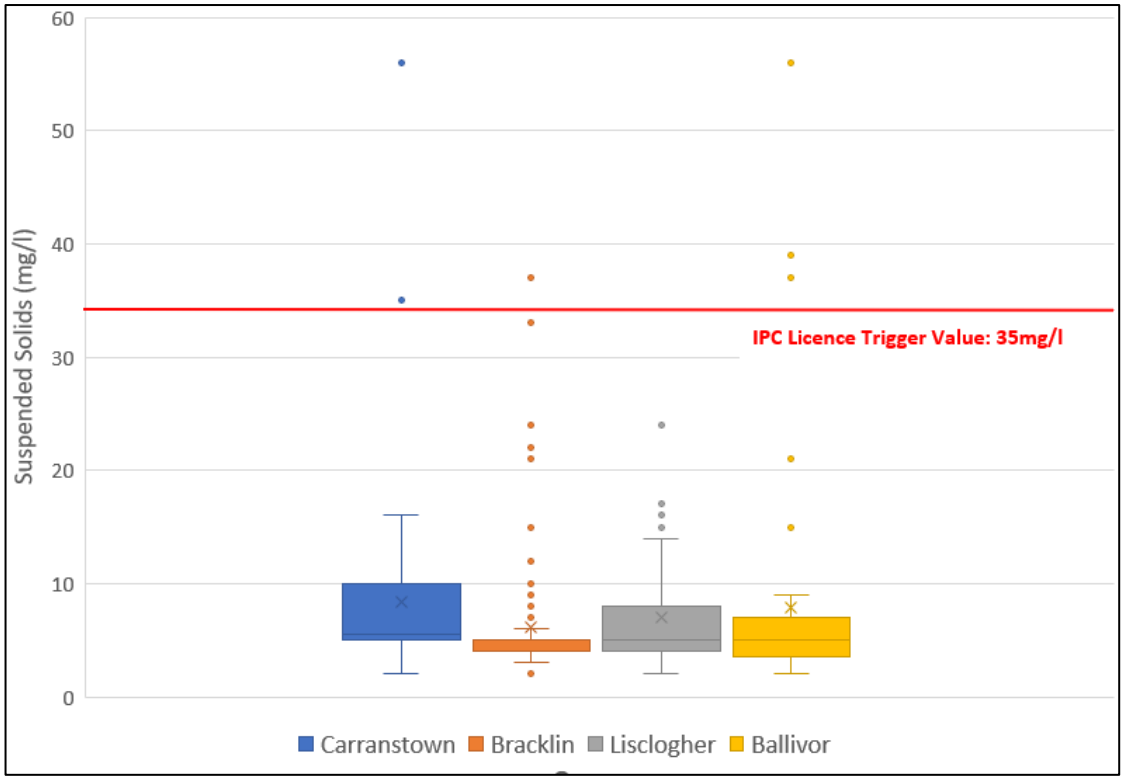


Figure 8-22: Bord na Móna Suspended Solids Monitoring (2000-2022)

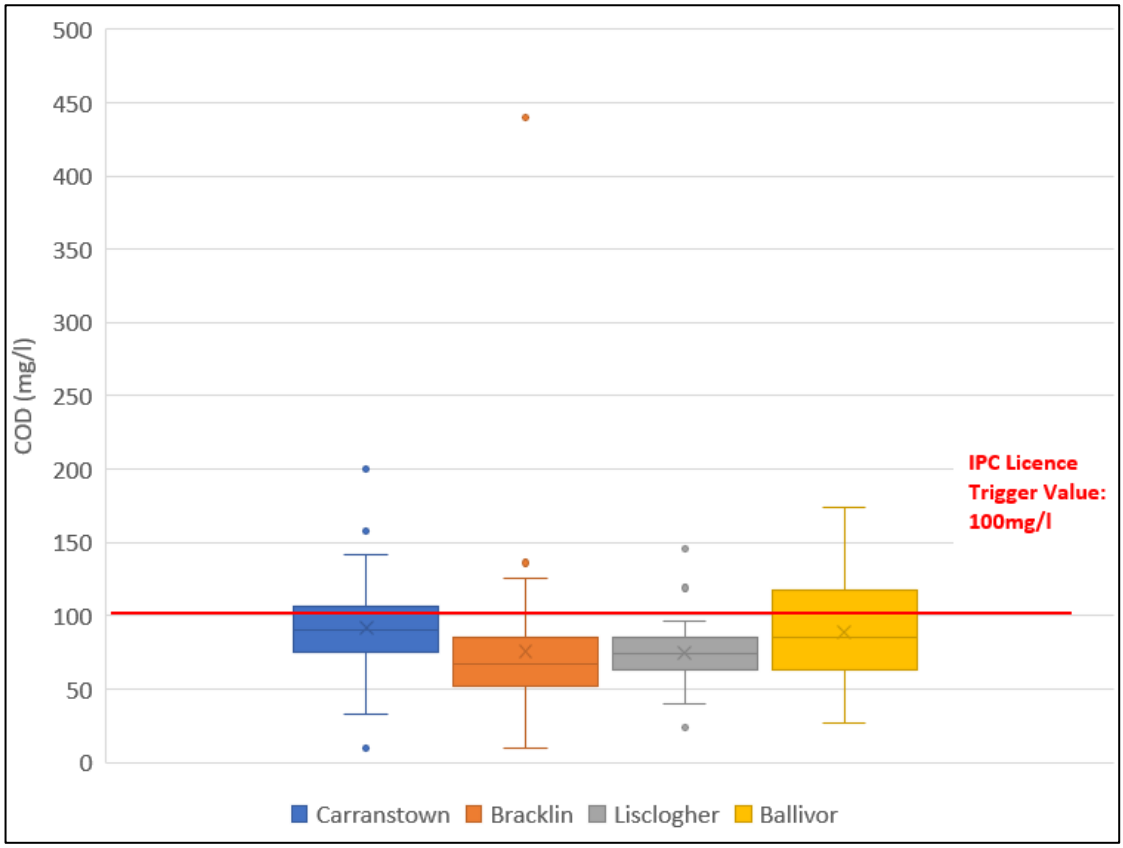


Figure 8-23: Bord na Móna COD Monitoring (2000-2022)

Table 8-13: Bord Na Móna water quality monitoring data (2000-2022)

Bog Name	No. Samples	COD (mg/L)	pH [H^+]	Ammonia (mg/L)	Total Phosphorous (mg/L)	Suspended Solids (mg/L)	Flow (L/s)
		Range	Range	Range	Range	Range	Range
Ballivor	36	27 - 174	7.1 - 8.1	0.02 - 2.51	0.05 - 0.21	2 – 56	-
Carranstown	86	10 – 200	6.0 – 8.3	0.02 - 2.8	0 - 0.65	2 - 56	0.1 65.7
Bracklin	81	10 - 440	5.4 - 7.9	0.019 - 2.6	0.05 - 0.5	2 37	0 - 20.5
Lisclogher & Lisclogher West	41	24 - 146	4.3 - 8.1	0.04 - 3.49	0.05 - 0.14	2 - 24	-
IPC Licence Limit		**100mg/l**	**6 - 9**	**2.78g/l**	**-**	**35mg/l**	**-**
n - (number of sample results)		244	244	244	243	243	NA
No. Exceedances		75	NA	10	NA	6	NA
% Compliant		69%	NA	96%	NA	98%	NA

8.4.5.3 HES Surface Water Quality Monitoring (2021 - 2022)

As part of the application for the proposed Ballivor Wind Farm, surface water sampling and field hydrochemistry was conducted by HES during 3 no. sampling rounds on 21st April, 28th October 2021 and 19th January 2022. Field hydrochemistry measurements were recorded within surface watercourses directly downstream of the Application Site. The results are listed in **Table 8-14.** The monitoring locations were typically small streams and drainage channels and are shown on **Figure 8-24**.

Specific conductivity (SPC) values at the monitoring locations ranged between 126 and 814µS/cm, with an average conductivity value of 581µS/cm. Turbidity ranged from 3.1 to 67.3NTU, with an average of 8.6NTU. The highest turbidity was recorded at SW1 within the Stonyford_030 SWB to the west of Lisclogher Bog. This (67.3NTU) turbidity value is anomalously high and most likely due to disturbance of sediment within the water column prior to sampling. Excluding this value, the turbidity ranged between 3.1 – 16.2 NTU. Dissolved Oxygen ranged from 4.72 to 11.04mg/l.

The pH values were generally slightly basic, ranging between 6.5 and 7.94, with an average pH of 7.54. Slightly acidic pH values of surface waters would be typical of peatland environments due to the decomposition of peat. However, the pH is likely higher due to the high temperatures and dry weather which preceded the monitoring.

Table 8-14: Field Parameters - Summary of Surface Water Chemistry Measurements (01/04/2021-19/01/2022)

Location ID	Easting	Northing	Temp °C	DO (mg/l)	SPC (µS/cm)	pH	Turbidity	Flow (l/s)
SW1	267157	258608	7.7 – 12.7	7.7 – 8.74	602 – 655	6.98 - 7.43	6.4 - 67.3	5 – 20
SW2	265941	256979	8.4 – 12.6	7.76 - 10.5	488 – 620	7 - 7.74	4.2 - 7.34	250 – 500
SW3	264510	257940	8.6 – 12.5	7.82 - 10.41	520 – 655	6.73 - 7.7	6.4 – 11.3	40 – 200
SW4	264256	257932	9.1 – 12.4	7.21 - 7.38	240	6.5 - 6.8	6.6 – 7.2	Dry – 15
SW5	263963	258213	8 – 12.5	7.68 - 10.31	534 – 653	7.1 - 7.72	4.5 - 6.9	150 – 500
SW6	262538	258647	8.1 – 12.4	6.08 - 10.52	635 – 747	6.9 - 7.84	5.07 – 16.2	150 – 200
SW7	259076	256500	8.4 – 12.9	9.32 - 9.48	561 – 582	7.47 – 7.62	6.03 – 11.4	60 – 150
SW8	265096	256383	9.3 – 12.8	7 - 9.9	438 – 538	6.75 - 7.67	9.05 - 13.5	100 – 300
SW9	261633	254196	8.5 – 12.7	7.57 - 9.94	667 - 752	7.33- 7.65	4.71 – 7.9	50 – 150
SW10	263431	254466	7.7 – 12.3	6.59 - 8.18	668 – 818	7.05 – 7.37	5.03 - 5.8	20 – 50
SW11	263814	254919	5.4 – 11.7	4.72 - 7.87	126 - 169	6.9 - 7.42	7.3 – 8.7	0
SW12	267169	254292	7.8 - 12.9	7.92 - 9.98	695 – 760	7.52 - 7.65	4.55 - 7.26	30 – 180
SW13	268774	253917	7.4 – 13.1	7.62 - 9.81	656 – 759	7.49 - 7.77	6.52 – 6.9	240 – 500
SW14	265783	256564	10 - 12.4	7.48 - 7.74	304	6.77 - 7.24	6.1 - 6.42	Dry - 20
SW15	268302	257158	8.4 – 12.9	8.27 - 11	725 -814	7.58 - 7.94	3.1 - 3.43	5000
SW16	267309	251730	7.8 – 13.3	7.32 - 8.85	504 -733	7.34 - 7.53	3.7 - 5.73	50 – 250
SW17	269032	249280	8.2 – 12.9	7.64 - 10.09	663 – 708	7 - 7.89	6.45 - 6.56	5000
SW18	266930	253281	7.1 – 12.9	9.75 - 11.04	357 - 422	7.76 - 7.91	7.4 - 8.36	15 - 75

Surface water samples were also taken at these locations for laboratory analysis. Results of the laboratory analysis are shown alongside relevant water quality regulations in Table 8-15 below. In addition, the European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009) are shown in Table 8-15. Original laboratory reports are attached as Appendix 8-2.

Table 8-15:Laboratory Data (01/04/2021-19/01/2022)

Location ID	Suspended Solids (mg/l)	BOD_5 (mg/l)	Orthophosphate (mg/l)	Nitrate (mg/l NO_3)	Ammonia (mg/l)	Chloride (mg/l)
EQS	**≤25([1])**	**≤ 1.3 to ≤ 1.5([2])**	**-≤ 0.035 to ≤0.025([2])**	**-**	**-≤0.065 to ≤ 0.04([2])**	**-**
SW1	13 - 40	1 - 4	<0.02 – 0.09	<5 – 13.2	0.2 – 0.6	12.9 – 22
SW2	6 - 19	1 - 4	0.02 - 0.09	11.8 – 21.5	0.13 - 0.25	11 – 15.2
SW3	<5 – 10	1 - 4	0.02 – 0.04	14.8 – 27.9	0.09 - 0.12	12.5 - 15.8
SW4[3]	6 - 80	2 - 3	0.11 - 0.33	<5	0.03 – 0.05	10 - 18.4
SW5	<5 - 5	1 - 2	<0.02 – 0.03	<5 – 28.4	0.12 – 0.2	11 - 15.9
SW6	<5 - 6	1 - 4	<0.02 – 0.03	19.7 – 35.4	0.11 – 0.13	17.3 - 17.6
SW7	<5 - 14	1 - 3	<0.02 - 0.03	<5 – 5.2	0.23 - 0.46	4.6 - 13.6
SW8	<5 - 32	1 - 4	<0.02 - 0.03	6.3 – 8.5	0.14 - 0.74	8.1 - 10.8
SW9	<5	1 - 3	<0.02 – 0.02	5.5 – 10.2	0.03 - 0.08	8 – 13.1
SW10	<5 - 14	1 - 2	<0.02 – 0.05	6.1 – 21.8	0.04 - 0.39	22.8 – 28.5
SW11	<5 - 8	2 - 4	<0.02	<5	0.12 – 0.22	6.5 - 13.6
SW12	11 - 29	1 - 3	<0.02	<0.05 - 11.9	0.05 – 0.11	16.9 - 23.9
SW13	<5 - 13	1 - 3	0.02 - 0.04	7 – 11.8	0.06 – 0.18	13.7 – 20.9
SW14[4]	6 - 9	2 - 4	0.06 - 0.3	<5	0.14 - 0.56	9.7 - 13
SW15	6 - 31	<1 - 3	<0.02	11.4 – 20.3	0.06 – 0.11	15.6 – 18.3
SW16	<5 - 6	<1 - 3	0.02 - 0.04	<5 – 9.8	0.2 - 0.37	10.7 - 18.3
SW17	5 - 12	<1 - 4	<0.02 – 0.03	9 – 15.3	0.04 – 0.09	12 - 15.5
SW18	6 - 51	1 - 3	0.02 – 0.04	<5 – 6.2	0.03 – 0.12	8.3 – 12.3

Suspended solid concentrations ranged from <5 to 80mg/l. Suspended solids were above the S.I 293/1988 threshold limits of 25 mg/L in 8 of the 52 no. samples.

Ammonia ranged between 0.03 to 0.74 mg/l, and were often above the threshold values for High (≤0.04 mg/L) and Good (≤0.065 mg/L) quality as set out in SI 272/2009. The presence of elevated ammonia is likely due to natural decomposition of peat.

Biological Oxygen Demand (BOD) ranged between <1 and 4 mg/l, with an average value of 2.07 mg/L, above the Good status[1] threshold value of 1.5 mg/L. Nitrate ranged between <5.0 and 35.4 mg/l and results were typically between 5-15 mg/l which is what would be expected in a peatland environment.

[1] *S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations*
[2] *S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 296/2009; S.I. No. 386/2015; S.I. No. 327/2012; and S.I. No. 77/2019 and giving effect to Directive 2008/105/EC on environmental quality standards in the field of water policy and Directive 2000/60/EC establishing a framework for Community action in the field of water policy).*
[3] *Only 2 no. rounds of sampling completed on 21/04/2021 and 28/10/2021.*
[4] *Only 2 no. rounds of sampling completed on 21/04/2021 and 28/10/2021.*

Nitrite was below the limit of detection of the laboratory in 67% of the samples, with the nitrite concentration in the remaining samples ranging from <0.05 to 0.15mg/l.

In comparison to S.I. No. 272/2009, 33 of 52 results (63%) for BOD exceeded the "Good Status" and "High Status" threshold values. In relation to ammonia, 41 of 52 samples (79%) exceeded the "Good Status" threshold of -≤0.065mg/l. For orthophosphate, 19 of the 52 no. samples (37%) were below the laboratory limit of detection (0.02mg/L), while a total of 13 of the 52 no (25%). no samples exceed the "Good Status" threshold of 0.035mg/l.

*Table 8-16: Chemical Conditions Supporting Biological Elements**

Parameter	Threshold Values (mg/L)
BOD	High status ≤ 1.3 (mean)
	Good status ≤ 1.5 mean
Ammonia-N	High status ≤ 0.04 (mean)
	Good status ≤0.065 (mean)
Orthophosphate	High status ≤0.025 (mean)
	High status ≤0.025 (mean)
	Good status ≤0.035 (mean)

* S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 296/2009; S.I. No. 386/2015; S.I. No. 327/2012; and S.I. No. 77/2019 and giving effect to Directive 2008/105/EC on environmental quality standards in the field of water policy and Directive 2000/60/EC establishing a framework for Community action in the field of water policy).

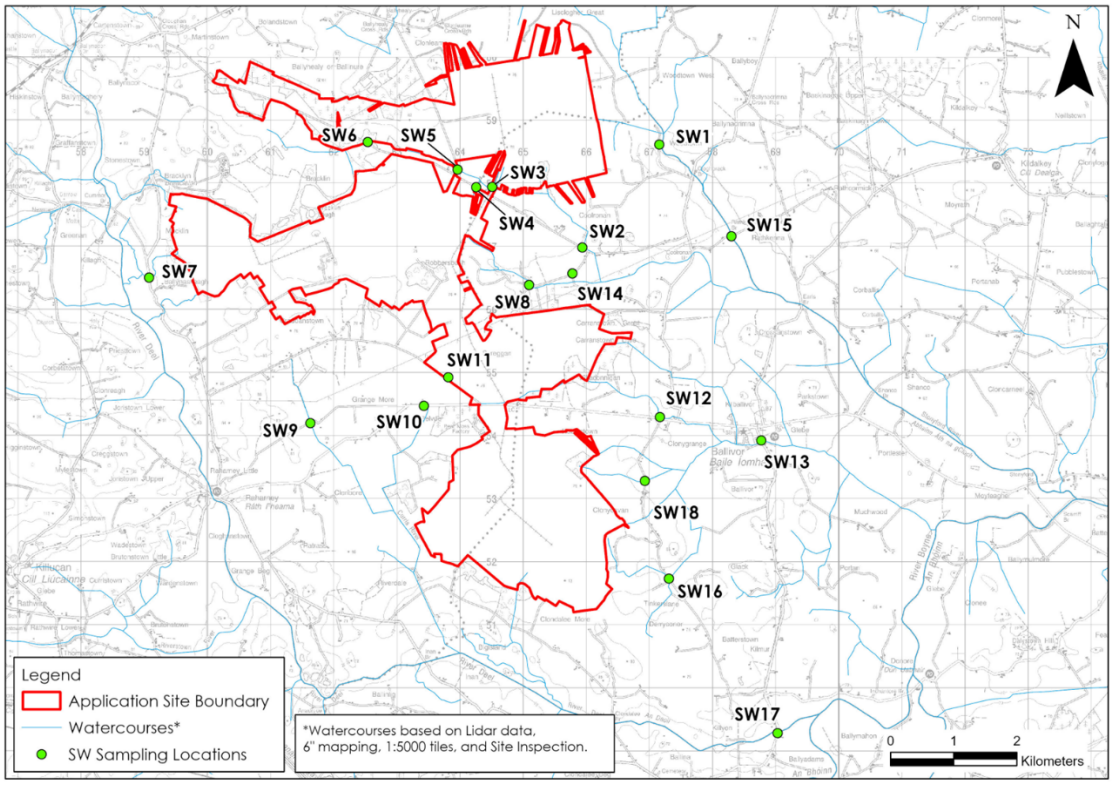


Figure 8-24: HES Surface Water Sampling Locations (2021-2022)

8.4.6 Hydrogeology

The majority of the bedrock geology underlying the Application Site including the Dinantian Pure Unbedded Limestones of the Waulsortian Limestone Formation and the Dinantian Upper Impure

Limestones of the Lucan Formation are classified by the GSI as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (Ll). The Tober Colleen Formation which underlies sections of Lisclogher, Lisclogher West and Bracklin Bog is classified as a Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones (Pl). A bedrock geology aquifer map is attached as Figure 8-25.

The 5 no. bogs comprising the Application Site are underlain by the Athboy Groundwater Body (GWB) (IE_EA_G_001) which is characterized by poorly productive bedrock. This is a large GWB that extends from Navan in the northeast to Tyrrellspass in Westmeath. The topography of the GWB is relatively low, with overall elevations falling from northwest to southeast. The GWB is composed primarily of moderate permeability rocks, although localized zones of enhanced permeability do occur. Groundwater flow will mainly occur laterally through the upper weathered zone of the aquifer. Below this, flow occurs along fractures, faults and karstic conduits. Recharge occurs diffusely through the subsoils and via outcrops and in some local areas direct recharge may be possible where via sinking streams. The aquifers are generally unconfined but may be locally confined where the subsoil is thicker and/or less permeable. Regional groundwater flow is from northwest to southeast, but locally, groundwater discharges to the streams and rivers crossing the aquifer. In general, groundwater flow paths will be less than a kilometre from recharge to discharge point; longer groundwater flow paths may develop where there is a higher degree of karstification. Groundwater discharges to the numerous small streams crossing the aquifer, and to the springs and seeps. There may also be some discharge to the Trim GWB to the east of this body.

Due to the presence of the peat at the Application Site and the bulk low permeability of the underlying mineral soil deposits, local groundwater recharge will be minimal. Recharge is likely to be limited to the perimeter of the bog where the peat is thin or absent (the presence of peat will prevent rapid recharge to underlying regional groundwater systems). Groundwater movement through the underlying subsoil glacial deposits will be relatively slow unless higher permeability sands and gravels are present. Based on topography and regional surface water drainage flows, local groundwater flow direction is towards the southeast of the Application Site, towards the River Boyne. As stated above more localised groundwater flow directions will occur, with groundwater discharging to nearby streams and rivers such as the Deel(Raharney) river to the west of the Application Site and the Stonyford river to the east.

A shallow perched ground water table exists in the peat and is largely isolated from the underlying regional groundwater system (which occurs in the underlying till and bedrock). There has been little alteration of the hydrogeological (regional groundwater, i.e. the groundwater system below the bogs, which is separate (perched above) from the near surface peatland hydrogeology) environment at the Application Site from predevelopment to the present day. The underlying hydrogeological baseline environment *i.e.* the underlying bedrock and aquifer type does not change over time. However, the primary method of change is the alteration of the hydrological (surface water) regime.

Bog drainage may alter the hydrogeological regime very slightly, by increasing the ratio of runoff to recharge. In general, peat bogs are typically characterised by low groundwater recharge, with the GSI generally estimating recharge rates of ~4% of effective rainfall for peat bogs. Therefore, the scale of any change has to be understood in the context that the Application Site would have had a very high natural runoff rate. The peat at the Application Site is broadly underlain by low permeability clays and gravelly clay, which further limit the infiltration of water downwards into the underlying aquifer. Rainfall is therefore stored within the peat and slowly infiltrates to ground or discharges (via surface water runoff) to streams surrounding the bogs. Following the drainage of the bog, the hydrology changes and storage is reduced within the peat by creating drainage channels to channel rainwater off the bogs and directly to streams/waterbodies.

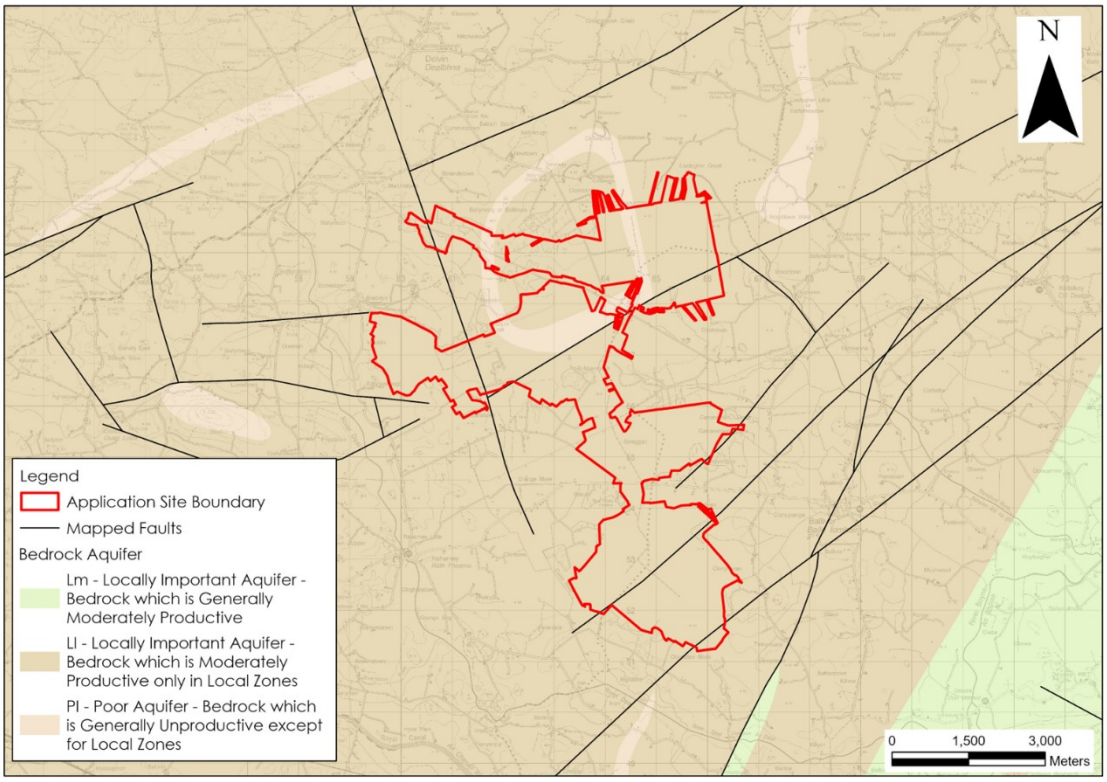


Figure 8-25: Bedrock Geology Aquifer Map

8.4.7 Groundwater Vulnerability

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities (www.gsi.ie). More scientifically, groundwater vulnerability embodies the characteristics of the intrinsic geological and hydrogeological features at a site that determine the ease of contamination of groundwater.

According to the GSI online database (www.gsi.ie) the vulnerability rating of the bedrock aquifer underlying Application Site is classified as "Moderate" to "Low" which is consistent with the presence of basin peat underlain by lacustrine/mineral soil clays and glacial deposits. This means there is a low potential for groundwater dispersion and movement within the aquifer, therefore surface water bodies, such as drains and streams, are more vulnerable to pollution than groundwater.

Groundwater vulnerability is extremely high in karst areas due to the high degree of interconnection between surface and groundwaters in these areas. The GSI does not record the presence of any karst features within the Application Site or in its immediate vicinity. The closest mapped karst feature is a spring (GSI Identifier: 2325SEK005) located in the townland of Dardistown, ~2.7km northwest of Bracklin Bog.

8.4.8 Groundwater Hydrochemistry

There is no groundwater quality data for the aquifers underlying the Application Site. Groundwater sampling would generally not be undertaken during the process of peat extraction activities and all ancillary works, as groundwater quality impacts would not be anticipated given the shallow nature of the peat extraction activities and all ancillary works, the low potential for groundwater dispersion and movement within the underlying bedrock aquifer is outlined in the preceding section. Consequently, no groundwater sampling was required as part of the IPC licence conditions for the extraction of peat at the Ballivor Works.

The Athboy Groundwater Body Initial Characterisation Report (www.gsi.ie) states that, data collected by the EPA for this GWB indicates that the groundwaters are typically hard with a calcium-bicarbonate signature and alkalinities of over 250mg/l. Hardness generally ranges from 250 - 350 mg/l as $CaCO_3$, with high electrical conductivities (600 – 700 µS/cm). Table 8-17 provides a summary of the hydrogeological characteristics on each of the 5 no. bogs.

Table 8-17: Hydrogeological characteristics of the Ballivor Bog Group.

Bog Name	Aquifer Type	GWB	GW Vulnerability	GW Hydrochemistry	Nearest Mapped Karst Feature
Ballivor	LI	Athboy	Generally Low, some Moderate vulnerability in south and east	Generally: Ca-HCO_3, with hard water	Spring located ~7.7km to the west
Carranstown	LI	Athboy	Moderate in the east and north, Low in the South and West.	Generally: Ca-HCO_3, with hard water	Spring located ~8.5km to the west
Bracklin	LI, PI	Athboy	Generally Moderate, Low in the West	Generally: Ca-HCO_3, with hard water	Spring located ~2.7km to the northwest
Lisclogher	LI, PI	Athboy	Low	Generally: Ca-HCO_3, with hard water	Spring located ~7km to the west
Lisclogher West	LI, PI	Athboy	Low	Generally: Ca-HCO_3, with hard water	Spring located ~3.5km to the southwest

8.4.9 Water Framework Directive Water Body Status & Objectives

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722/2003).

The River Basin Management Plan was adopted in 2018 and has amalgamated all previous river basin districts into one national river basin management district. The River Basin Management Plan (2018 - 2021) objectives include the following:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2021;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Our understanding of these objectives is that surface waters, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed, i.e. there should be no negative change in status at all.

Please note that there is no requirement to assess the peat extraction activities and all ancillary works at the Application Site which predate 2003 and the transposition of the WFD Directive into Irish Law. The impacts of the activities on the WFD status of downstream and underlying waterbodies are assessed in Appendix 8-4.

8.4.10 Groundwater Body Status

Local Groundwater Body (GWB) and Surface water Body (SWB) status reports are available for download from (www.wfdireland.ie).

The Athboy GWB (IE_EA_G_001) underlies the Application Site. This GWB has been assigned 'Good Status' in all 3 no. WFD cycles (2010-2015, 2013-2018 and 2016-2021) (Table 8-18). This status is defined based on the quantitative status and chemical status of the GWB. The Athboy GWB is deemed to be "At risk" of not meeting its WFD objectives, however, no significant pressures have been identified to be impacting this GWB.

Table 8-18: WFD Groundwater Body Status

Ground Waterbody	Status 2010-2015	Status 2013-2018	Status 2016-2021	3rd Cycle Risk Status	WFD Pressures
Athboy	Good	Good	Good	At Risk	-

8.4.11 Surface Water Body Status

A summary of the WFD status and risk result of Surface Water Bodies (SWBs) in the vicinity and downstream of the Application Site are shown in Table 8-19 below.

The western section of Bracklin Bog is drained by the Deel(Raharney)_030 SWB. The status of this SWB has improved from "Moderate" in the 2013-2018 round to "Good" in the latest round (2016-2021). Further downstream the Deel(Raharney)_040 SWB achieved "Good" status in all 3 no. monitoring rounds while the Deel(Raharney)_050 SWB was assigned "Moderate" status. The Deel(Raharney)_060 SWB drains the western section of Ballivor Bog, and its status has increased from "Moderate" in the 2010-2015 round to "Good" in the 2013-2018 round and has remained of "Good" status in the latest 2016-2021 round. Further downstream the Boyne_050 achieved "Good" status in all 3 no. WFD rounds.

The Boyne_060 SWB drains the eastern section of Ballivor Bog and Carranstown Bog. This SWB has also experienced an improved status from "Moderate" in 2010-2015 to "Good" in 2013-2018 and 2016-2021. The Stonyford River drains Lisclogher, Lisclogher West and Bracklin bogs. The Stonyford_030 has consistently deteriorated in status throughout each of the WFD rounds, having "Good" status in 2010-2015, to "Moderate" in 2013-2018, to "Poor" in 2016-2021. The Stonyford_040 however, received a deterioration in status from "Good" in 2010-2015 to "Moderate" in 2013-2018 and remained to be of "Moderate" status in 2016-2021. Further downstream the Boyne_070 and Boyne_080 both achieved "Moderate" status in the latest WFD round.

The majority of these SWBs have been deemed to be "At risk" of not meeting their WFD objectives. Hydromorphological changes have been deemed to be significant stressors on several of these SWBs. Hydromorphological pressures mean that the waterbody has experienced change to its physical habitat or natural functioning caused by, for example, channelisation and straightening of rivers or land drainage. Drainage of the Application Site to facilitate peat extraction activities and all ancillary works will likely have impacted the local hydrological regime by altering the natural flow volumes and potentially increasing sediment concentrations (which is not borne out by water quality monitoring data as demonstrated above) in waterbodies due to the increase in connectivity of drains to the surrounding river network.

Table 8-19: Summary WFD Information for Surface Water Bodies

River Waterbody	Status 2010-2015	Status 2013-2018	Status 2016-2021	3rd Cycle Risk Status	WFD Pressures
Deel (Raharney)_030	Good	Moderate	Good	At Risk	-
Deel (Raharney)_040	Good	Good	Good	Not at Risk	-
Deel (Raharney)_050	Moderate	Moderate	Moderate	At Risk	Hydromorphology
Deel (Raharney)_060	Moderate	Good	Good	Under Review	Hydromorphology
Boyne_050	Good	Good	Good	Not at Risk	-
Boyne_060	Moderate	Good	Good	At Risk	Hydromorphology
Stonyford_030	Good	Moderate	Poor	At Risk	-
Stonyford_040	Good	Moderate	Moderate	At Risk	-
Boyne_070	Good	Moderate	Moderate	At Risk	-
Boyne_080	Moderate	Moderate	Moderate	At Risk	Hydromorphology

8.4.12 Designated Sites and Habitats

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). Designated sites that lie downstream of the Application Site include:

- River Boyne and River Blackwater SAC (Site Code: 002299), Deel (Raharney), Stonyford and Boyne rivers are mapped within this SAC;
- River Boyne and River Blackwater SPA (Site Code: 004232), Deel (Raharney), Stonyford and Boyne rivers are mapped within this SPA;
- Boyne Woods pNHA (Site Code: 001592), 26km northeast of Lisclogher Bog and to the east of Navan Town along the River Boyne;
- Crewbane March pNHA (Site Code: 000553), 35km northeast of Lisclogher Bog along the River Boyne;
- Dowth Wetland pNHA (Site Code: 001861), 40km northeast of Lisclogher Bog;
- Boyne River Islands pNHA (Site Code: 001862), 42km northeast of Lisclogher Bog and to the west of Drogheda; and,
- Boyne Coast and Estuary SAC and pNHA(Site Code: 001957), 48km northeast of the Lisclogher Bog.

The Application Site is hydrologically connected to the River Boyne and River Blackwater SAC and SPA via several drains and streams which flow from the bog areas into the Deel (Raharney), Stonyford and Boyne rivers. These flowpaths are outlined in detail in Section 8.4.3.

Several other designated sites are located downstream along the River Boyne and are therefore also hydrologically connected with the Application Site. However, these sites are located significant distances (>25km) from the Application Site. Consequently, the River Boyne and River Blackwater SAC/SPA remain the primary sensitive receptors due to their proximity to the Application Site and the direct hydrological linkage. This site was designated as a SAC in June 2003 and a SPA in November 2010.

A map of locally designated sites is included in Figure 8-26.

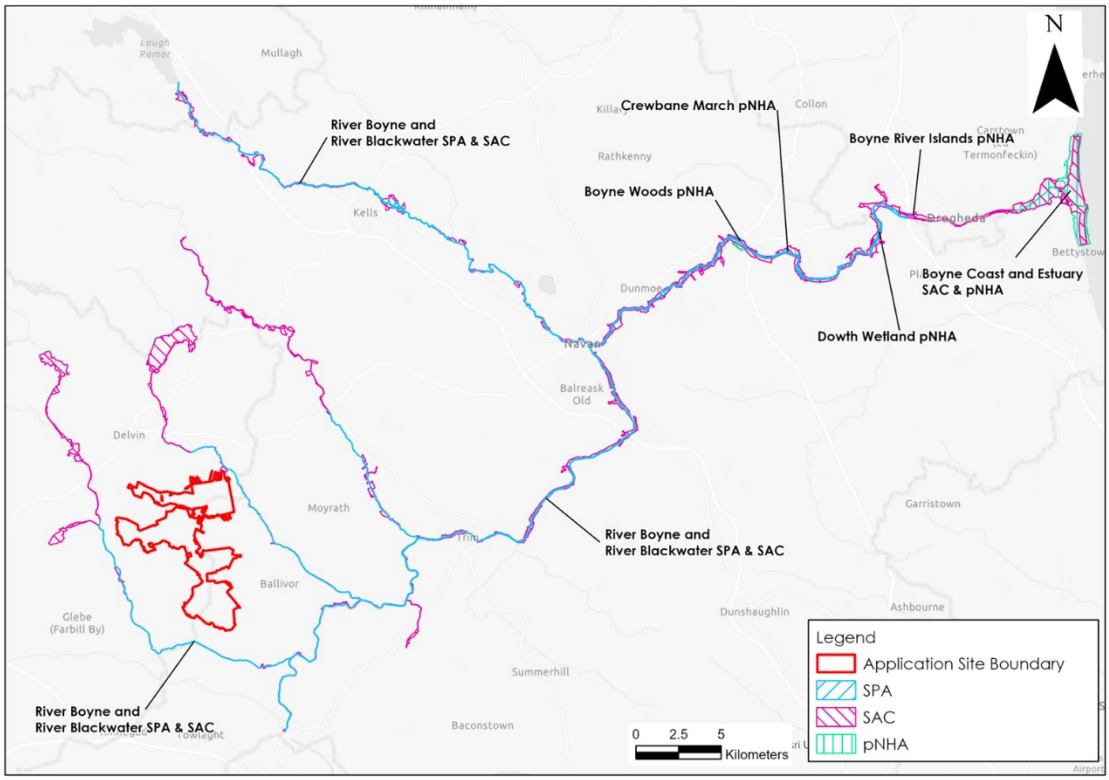


Figure 8-26: Map of Local Designated Sites

8.4.13 Water Resources

There is 1 no. mapped PWS (Public Water Supply Scheme) within 3 km of the Application Site. The Source Protection Area (SPA) for the Ballivor PWS is located to the east of Carranstown and Bracklin bogs, approximately 1.5 km north of Ballivor village. This SPA is more than 2km from the boundary of the Application Site.

A search of private well locations (wells with location accuracy of 1–100m were only sought) was undertaken using the GSI well database (www.gsi.ie). One well (GSI Name: 2625SWW072) was identified in the east of Ballivor Bog in the townland of Clonycavan. This well reports a poor yield class of 8.7m^3/day.

Several additional wells with a location accuracy of 1km are mapped in the vicinity of the Application Site. These wells all have a poor yield class. As these wells are mapped only to an accuracy of 1km and therefore assessing potential impacts on these wells cannot be undertaken in any reliable manner.

8.4.14 Receptor Sensitivity

Due to the nature of peat extraction activities and all ancillary works being near surface activities, impacts on groundwater quality and quantity below individual bogs are generally negligible as there are

still considerable depths of peat remaining in each of the 5 bogs, although deep perimeter drains may have local drainage impacts on surrounding land. Surface water quality is the main sensitive receptor as drainage of the Application Site will potentially have altered the local natural hydrological regime.

Based on the criteria set out in Table 8-2 above, the Locally and Moderately Important Aquifers underlying the Application Site can be classed as of Medium Importance. The primary risks to groundwater during peat extraction activities and all ancillary works would have been from hydrocarbon spillage and leakages from plant serving and facilitating the peat extraction activities and all ancillary works. The Application Site is covered in cutover peat which in turn is underlain by clay and silt dominated glacial deposits and these layers act as a protective cover to the underlying bedrock aquifer. The glacial deposits are not mapped as an aquifer, but they are likely to be used locally as a water supply and therefore they can also be classed as Sensitive to pollution. However, due to the presence of the peat and silt/clay layers (which have low permeability and act as a barrier to infiltration), any contaminants which may be accidentally released on-site are more likely to travel to nearby streams within surface runoff.

At the beginning of the assessment period i.e., the 1988 baseline, the Boyne River downstream of the Application Site was of Extremely High Importance due to its designation as a 'Salmonid waters' under the European Communities (Quality of Salmonid Waters) Regulations, 1988. Meanwhile in the vicinity of the Application Site, the Deel (Raharney) and Stonyford rivers were of Very High Importance with these waterbodies being of 'High' and 'Good' biological Q-value status respectively. The Deel, Stonyford and Boyne rivers were designated as a SAC in June 2003 and a SPA in November 2010. This recognition of the ecological importance of these SWBs, therefore, increased the importance of the Deel (Raharney) and Stonyford surface waterbodies to Extremely High. During peat extraction activities and all ancillary works, namely the associated bog drainage, the main risks to local surface water quality would have been increased concentration of suspended solids and increased flow volumes downstream. In addition, hydrocarbon spillage and leakages would have been a constant potential threat to water quality during peat extraction activities and all ancillary works.

8.5 Characteristics of the Project

8.5.1 Peat Extraction Phase (July 1988 – June 2020)

A full description of the peat extraction activities and all ancillary works completed at the Application Site from 1988 are described in detail in Chapter 4.

By 1988 peat extraction activities and all ancillary works were well established at Ballivor, Bracklin, Lisclogher and Carranstown (west). By this time drainage had already been inserted at all 5 no. bogs, and railway infrastructure had been laid on all bogs with the exception of Lisclogher West.

Lisclogher West itself was drained between 1973 and 1995, with 6 no. silt ponds and 6 no. surface water emission points inserted into the bog. However, Lisclogher West was never subject to industrial peat extraction activities and ancillary works.

Elsewhere across the Application Site peat extraction activities and all ancillary works continued at different times and at different levels of intensity from July 1988 to June 2020. A total of 2,880,975m^3 of peat has been extracted from the Application Site since 1988. Peat has been extracted using two different methods, milled and sod, outlined briefly below and described fully in Chapter 4. In general, milled peat extraction is extracted from deep peat layers while sod moss extraction occurs at the bog margins and in areas of high bog.

During this time period milled peat extraction activities and all ancillary works occurred at Ballivor, Carranstown, Bracklin and Lisclogher bogs. Records indicate that the Derrygreenagh Bog Group, of which the Ballivor Bog Group and thus the Application Site is a subset, supplied peat to the Rhode ESB Power Station, Croghan Briquette Factory, Kilberry and Cúil na Móna when required. Information

regarding which bogs supplied which specific end user, quantities of supply, frequency of travel and travel routes are not available. From 1985, peat from the Application Site was also distributed in bulk from the peat loading facility at Ballivor Works to the horticulture industry overseas via Dublin Port

Milled peat extraction requires good solar drying condition and can occur anytime from April onwards once suitable drying conditions are present. There are 4 no. stages involved in the process of milled peat extraction activities and all ancillary works outlined below:

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

As part of the development of the bogs for milled peat extraction activities and all ancillary works, parallel surface water drains were created at intervals of ~15m, with the section of bog between the drains referred to as production fields. The fields are slightly convex to facilitate runoff and to prevent surface water ponding. The drains fall towards the headland, located at the ends of the production fields. The drains are piped across the headland, allowing machinery to pass from one field to the next. The drainage network then continues to a series of silt ponds prior to discharging to a local watercourse. By 1988, drainage had already been implemented across much of the Application Site with the exception of Lisclogher West.

Meanwhile sod moss extraction was undertaken by the Applicant at both Lisclogher and Ballivor bogs during this time period. In addition to these, third party sod peat extraction activities and all ancillary works has occurred at Lisclogher Bog from the 1990s until 2020. Sod moss is the term used to describe peat produced in block form for horticultural use. The sod moss is extracted mechanically with specially equipped excavators. The sods are cut from mini face-banks or the margins of trenches that are gradually widened and left on the bog to dry for approximately 12 months, reducing moisture content from 90% to 50% - 60%. Once the required moisture content is reached the sod moss is stockpiled at the edge of bog prior to transportation for processing. One layer is typically cut at a time until the horticultural peat is exhausted.

The peat extraction activities and all ancillary works areas were served by a railway line which was moved around the Application Site as different areas came in and out of peat extraction activities and all ancillary works. During this time period several buildings and other infrastructures were constructed at the Application Site to support peat harvesting operations. These included a Welfare Centre constructed in the townland of Grange More (1988), an extension to the pre-existing storage facilities (1990), construction of an ESB sub-station (2005), the laying of 2 no. grass strips (2013) and the erection

of a guyed wind monitoring mast (2015/2016). Apart from the latter monitoring mast, these developments supported the existing processing plant, loading bay and workshop located at the Ballivor Works.

In terms of environmental monitoring, control and monitoring measures have been implemented at the Application Site since 1988. Initially these included the incorporation of silt ponds into the bog drainage system to minimise the concentrations of suspended solids entering local watercourses from the bog drainage network. These control measures were upgraded and enhanced in accordance with IPC Licence conditions from April 2000. Please refer to Chapter 4 and Appendix 4-1 for full details of the IPC Licence conditions.

8.5.2 Current Phase (June 2020 – Present Day)

The Current Phase of the Project includes all activities carried out at the Application Site from the cessation of peat extraction activities and all ancillary works in June 2020 to the present day.

During this time period, the decommissioning activities at the Application Site have been limited to the removal of stockpiled peat with no peat extraction activities and all ancillary works occurring during this phase of the development. From mid-2020 to mid-2021 the operations at the Application Site reduced to transferring stockpiled peat to the Ballivor Works (the Works) for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derrinlough Briquette Factory, both in Co. Offaly. The Works ceased operation mid-2021. From mid-2021, stockpiles of peat were removed from across the Application Site, transferred to a conveyor via tipple trucks and subsequent transport to either Kilberry Horticulture Works, Edenderry Power Plant, and/or the Derrinlough Briquette Factory. Final stockpiles at Ballivor Bog were removed in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

The drainage infrastructure, silt ponds and surface water discharge locations continue to be in operation and to be maintained as per the IPC Licence requirements. The silt ponds are maintained in accordance with Condition 6 of the IPC Licence, which states that all drainage from boglands is discharged via appropriately designed silt ponds which are desilted twice a year. The silt arising from these operations is either stockpiled a safe distance from drainage features or spread onto production fields.

Environmental monitoring and drainage and silt maintenance continued during this phase of the development in accordance with IPC licence conditions.

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures, which is in addition to the IPC licence requirement (does not form part of this substitute consent application) and is being is being applied at specific locations across the Applicant's landbank that are identified as suitable for the prescribed enhancement measures. PCAS measures to rewet peat including intensive and targeted drain blocking have commenced in Carranstown East, Lisclogher West and Bracklin West (refer to Chapter 4 Section 4.8.2 for further details in relation to PCAS) during the Current Phase of the Project.

8.5.3 Remedial Phase

It is currently proposed to implement a Cutaway Bog Decommissioning and Rehabilitation Plan at each of the bogs comprising the Application Site. Rehabilitation has already commenced on a section of Carranstown Bog. These Cutaway Bog Decommissioning and Rehabilitation Plans are required in order to fulfil the requirements of Condition 10.2 of the IPC licence No. P0501. Each Cutaway Bog Decommissioning and Rehabilitation Plan, as per Condition 10 of the IPC Licence will be subject to agreement with the EPA. To date, Carranstown 2022 Cutaway Bog Decommissioning and Rehabilitation Plan and Lisclogher-West 2023 Cutaway Bog Decommissioning and Rehabilitation Plan

have been approved by the EPA, Ballivor Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan, Bracklin Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan, and Lisclogher East 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan will be reviewed with the EPA and approved by same prior to their implementation.

The Applicant have devised Cutaway Bog Decommissioning and Rehabilitation Plans to stabilise and rehabilitate the peat bogs within the Application Site. The plans use bespoke interventions designed to first stabilise the environment and secondly to rehabilitate the Application Site as much as possible by placing the existing peatland environments on a path towards naturally functioning peatlands. Rehabilitation allows a site to naturally colonise with vegetation to stabilise the bare peat production fields and minimise water pollution. Whilst the proposed rehabilitation plans have a ~5 year timeframe, in general the Applicant's peatlands cannot be restored back to the raised bog in a reasonable timeframe as their environmental conditions have been so radically altered from its natural state.

The proposed Cutaway Bog Decommissioning and Rehabilitation Plans at the Application Site will be undertaken using standard best practices (refer to Appendix III of the Cutaway Bog Decommissioning and Rehabilitation Plans included as Appendix 4-2). Each individual bog comprising the Ballivor Bog Group has its own unique history of peat extraction activities and all ancillary works operations, therefore the most appropriate rehabilitation approach is bog-specific reflecting local ecological and hydrological factors. For example, the rehabilitation of the milled peat extraction activities and all ancillary works area in Bracklin West will be different to that of Lisclogher West, which was never subject to industrial scale peat extraction activities and all ancillary works.

The Applicant's rehabilitation plans identify two scenarios present at the Application Site which will determine any additional targeted revegetation or rewetting measures to be implemented. Firstly, in the case that significant acid peat remains at the surface, there will be an assessment of the area to implement an intensive programme of drain-blocking and promote the re-establishment of more typical bog communities. Secondly, where alkaline peat is exposed at the surface the land is likely to revert to more alkaline poor fen/wetland or birch dominated scrub ecosystems where the development of these communities will depend on the potential to rewet the site.

The greatest hydrological/hydrogeological effects will be experienced in those areas selected for rewetting following ecological surveying. Rewetting would be achieved through measures such as drain blocking. This would raise the local peat water table, establishing a more suitable hydrological/hydrogeological regime, making these areas suitable for colonisation by more typical bog communities. Elsewhere where rewetting is not suitable the drainage regimes will remain relatively unchanged.

The rehabilitation plans comprise of short-term planning actions, short term practical actions and long-term actions. The initial short-term planning actions will involve seeking approval of the rehabilitation plans from the EPA. In addition, detailed site plans of how the various rehabilitation measures will be applied will be developed for each bog and a review of all issues and constraints which may impact the proposed Cutaway Bog Decommissioning and Rehabilitation Plans will be completed. The short-term planning actions will ensure that all activities associated with the rehab plans will be completed in accordance with the requirements of the IPC licence. Several short-term actions will be completed in the first 2 years following EPA approval of the Cutaway Bog Decommissioning and Rehabilitation Plans. These actions will include intensive drain blocking and monitoring of the rehabilitation measures. Silt ponds will continue to function during this phase of the rehabilitation plans. Longer term actions (>3 years) include the evaluation of the success of the short-term rehabilitation measures and undertake further remediation where necessary. Long-term monitoring, aftercare and maintenance will be completed until the IPC licence is surrendered. It is understood that during this phase of the rehabilitation plans, silt ponds will be decommissioned if necessary.

Much of the work associated with the Cutaway Bog Decommissioning and Rehabilitation Plans will occur during the initial stages of the plan. Once drain blocking and other measures have been implemented the operational activities will comprise non-intrusive ecological and hydrological

monitoring and may also include minimal maintenance and repair works if/as those works are deemed necessary.

The proposed Cutaway Bog Decommissioning and Rehabilitation Plans contain enhanced rehabilitation measures associated with the PCAS. The proposed enhanced measures include intensive drain blocking, reprofiling of peat fields, fertilizer application and seeding of vegetation. Note that some of these measures have already been implemented in some areas of the Application Site (Carranstown East, Lisclogher West and Bracklin West during the Decommissioning and Rehabilitation Phase).

8.6 Assessment of Significant Effects and Control/Mitigation Measures

8.6.1 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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently. other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to the Applicant in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at

the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of the Applicant's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of the Applicant's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

8.6.2 Identification of Impacts

8.6.2.1 Peat Extraction Phase (1988 – 2020)

The Peat Extraction Phase of the Project includes all peat extraction activities and all ancillary works undertaken from July 1988 to the cessation of peat extraction activities and all ancillary works in June 2020.

8.6.2.1.1 *Effects of Bog Drainage on Bog Hydrogeology*

Impacts on bog hydrogeology can occur through drainage, both by surface water drainage and by groundwater drainage. Surface water drainage (increased frequency of drains and deeper perimeter drains) can impact peat water levels and have an indirect impact on surface vegetation. Increased drainage can also lead to increased runoff volumes from bog units, and this can alter the hydrology (by increased flow volumes, and increased magnitude of downstream flooding events) of the downstream receiving waters. Deep perimeter (bog perimeter) drains can alter the local underlying groundwater hydrogeology as they often intersect the mineral soil layers below the bogs.

To determine likely Zones of Influence (ZoI) of bog drainage infrastructures HES has previously completed a Peatland Hydrology Study as defined in Appendix 8. From that study, the following conservative ZoIs are defined for Bord na Móna bog units:

- Field drains can have a ZoI on peat water levels at a distance of up to 30m;
- Deep perimeter bog drains can have a ZoI on peat water levels at a distance of <100m;
- The ZoI of facebank drains depends on the height of the facebank. But a conservative ZoI for a 1.5m high facebank drain is 60m; and,
- The ZoI of the Applicant's pumping stations (which are generally <5m deep) on local groundwater levels is likely to be <300m (Please note that 2 no. pumping stations were located at Ballivor Bog during the Peat Extraction Phase).

These ZoIs are used in the assessment below, and also in the assessment of impacts on Designated Sites and groundwater supplies.

As stated in Section 8.3 the timing of drainage and the initiation of peat extraction varied across the 5 no. bogs comprising the Application Site. Ballivor Bog was the first bog to be drained between 1948 and 1953, with all remaining bogs drainage by the 1995 (Lisclogher West was the last area to be drained commencing in 1973). By 1995 drainage had already been inserted into all bogs within the Ballivor Group.

Following this initial drainage, there would have only been minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and the deepening of drains if required. According to figures supplied by the Applicant, the total volume of peat removed from the Application Site from 1988 to 2020 is estimated to be 2,880,975m^3 with an average of 90,030m^3 extracted per year. The depths of peat removed from the bogs vary as each individual bog has experienced its own unique history of peat extraction. As peat can act as a hydraulic sponge providing storage of water, the removal of peat potentially acts to reduce the [water] storage capacity of the bogs. However, when peat water levels within the bogs were reduced historically through initial bog drainage, the [water] storage capacity of the top ~0.5 – 1m of peat (dependent on the depth of drains) was essentially removed.

As such, the primary and significant hydrological and hydrogeological changes at each of the bogs commenced when their initial drainage occurred and the development of ancillary activities was installed (e.g. railway lines, machine passes, canteen structures, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks, and peat loading facilities).

Pathways: Groundwater volume and water level drawdown.

Receptors: Peat Bog Hydrogeology.

Control Measures:

The following measures were in place to mitigate against the effects of groundwater drainage of the bogs on the bog hydrogeology:

- Field drains with low gradients and shallow depths (<1.0m);
- Silt ponds, as well as being a control measure for sediment from the bogs, also acted as attenuation measures for higher flows during peak rainfall events. Each metre length of silt pond provides ~12m^3 of water storage, which aided in slowing down the discharge from the bog units;
- Silt ponds were cleaned at least twice a year to maintain adequate storage and treatment (sedimentation/settlement) capacity; and,
- Pipeline capacities were designed based on a runoff rate of 1.7 l/s/Ha, which is equivalent to the greenfield runoff rates.

Following drainage of the bogs they would no longer have been suitable for most natural bog vegetation. As the bogs were already drained by 1988 (except for Lisclogher West which had some minor drainage installed), the effect of continuing peat extraction activities and all ancillary works until 2020 would not have resulted in any major alteration of the local hydrogeological regime. The groundwater tables in these bogs had already been lowered during their initial draining which pre-dated 1988 and the hydrogeological regime at these bogs would already have been unsuitable for most bog communities. Only minor annual changes would have occurred during this phase of the Project.

8.6.2.1.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

Hydrological changes at each of the bogs commenced when their initial drainage occurred. The initial implementation of the bog drainage was at that time a significant change to the local hydrology at each bog unit. Peat can act as a hydraulic sponge providing storage of water. However, with the implementation of bog drainage, the water levels in the peat bog are lowered and the capacity of the

bog to store water is reduced. The available water storage within the bogs would have provided a small buffer for downstream flooding.

In terms of surface water quality, the primary potential negative impact on surface water quality would be the increase in suspended solid entrainment in surface waterbodies. The greatest risk of suspended sediment entrainment occurs during times of major earthworks, such as during the removal of vegetation and the construction of the bog drainage network. This potential pathway would pose a significant risk to local surface water quality downstream of the Application Site, particularly as the River Boyne which is capable of supporting populations of Salmonids which are particularly sensitive to elevated concentrations of sediments.

By 1988 the majority of the Application Site was already artificially drained, with some minor drainage installed on Lisclogher West within the Application Site. Consequently, the continued drainage of these bogs during the Peat Extraction Phase of the Project would have been limited in its potential to alter the hydrological regime in downstream watercourses. However, during the Peat Extraction Phase, there was an ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion of peat sediment via the bog drainage network. This potential pathway would pose a significant risk to local surface water quality, particularly as the River Boyne, Deel and Stonyford Rivers were all of Extremely High or Very High Importance in 1988. Other water quality parameters of concern are ammonia and Chemical Oxygen Demand (COD).

Pathway: Drainage and surface water discharge routes.

Receptor: Surface water quality and quantity on down gradient rivers (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Control Measures:

Pre-IPC Licence

Prior to the regulation of activities at the Derrygreenagh Bog Group (of which the Ballivor Bog is a subgroup) by the EPA which commenced in 2000, the Applicant were implementing several control measures to protect surface water quality in downstream waterbodies. These measures primarily relate to the concentrations of suspended sediments in discharge from the bogs and are summarised below:

- Internal drains cleaned on a regular basis in suitable weather. This was completed to remove sludge from the bottom of ditches, allowing them to retain full functionality. The sludge was disposed of by spreading it on the adjacent production fields where it was dried and harvested;
- Drain maintenance was carried out using draglines and excavators, ensuring that these drains were fit for purpose;
- Drain maintenance was carried out mainly prior to and post the harvesting season.
- Silt ponds were utilised to control the amount of sediment being discharged at outfalls. At this time, silt ponds were designed for an upper limit of 100mg/l suspended sediment;
- Silt ponds were upgraded in the 1990s to cater for the settling of sufficient amount of silt. This often included the construction of a second silt pond adjacent to the first, which was used as a backup and to facilitate desludging of the primary pond; and,
- Silt ponds were desludged twice per annum.

Active IPC Licence:

The Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The bog group also has a Surface Water Management Plan[5] which defines how compliance with the Licences is achieved. The drainage system in place at the bogs comprising field drains, main drains, piped drains, silt ponds upstream of outfall locations, is designed to prevent the release of elevated concentrations of suspended sediments into nearby surface waterbodies. As part of the IPC Licence, there is a limit of 35mg/l for suspended solids. Quarterly monitoring only recorded 3 no. exceedances of this threshold during the monitoring period (2000–2020).

Existing control measures which were implemented under the IPC licence are also designed to limit runoff rates from the bog units. These include:

- Silt ponds providing attenuation limited runoff during periods of intense rainfall; and,
- Continuous mitigation included maintaining the schedule of cleaning the silt ponds at a minimum of twice per year.

8.6.2.1.3 *Contamination of Groundwater by Leakages and Spills*

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 a 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.

Discharges from wastewater systems (septic tanks) at office buildings, and at welfare facilities and workshops could potentially have caused groundwater contamination. Activities and features associated with peat extraction include railway lines, machine passes, canteen structures, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks, and peat loading facilities. These potential impacts existed for all 5 no. bogs and their associated welfare facilities and workshops, but we understand from a review of available AERs (Annual Environmental Reports submitted to the EPA under the IPC licences) reports that no significant pollution events/spills to groundwater have occurred since 2000.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Local Groundwater Quality.

Control Measures:

Pre-IPC Licence:

Prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, the Applicant were implementing several control measures to reduce the risk of contamination by spills and leakages. These measures primarily relate to the storage of peat harvesting machinery, refuelling procedures and waste management. These measures are summarised below and outlined in full in Chapter 4 at Section 4.6:

- All machinery were stored at the Ballivor Works at the end of each workday;
- All machinery were regularly inspected, serviced and cleaned. Cleaning was completed at a wash bay which drained towards an interceptor tank and associated soak pit;
- Where possible all refuelling was completed at the Ballivor Works;
- In the event that on-site refuelling was required, it was done with a mobile fuelling unit;

[5] *Current version: SWMP 0501 Derrygreenagh 31.01.2020.pdf*

- In the event of an emergency spill, the following procedures were in place:
  - The General Manager (GM) was immediately informed of the incident.
  - The spill was assessed by the GM to assess the potential for environmental and/or health consequences.
  - The spill would have been sourced, isolated and contained with polystyrene booms or dry peat.
  - Every effort would have been made to prevent the spill from entering the nearest drain or outfall.
  - Once the spill was contained, a suitable absorbent (typically dry peat) was used to soak the spillage.
  - Follow up measures were taken to prevent such a spillage recurring in the future.
  - In the event of a spillage the GM notified 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; and,
- All washing from the self-contained machine parts washer was collected within a sludge tank at the Works.

Active IPC Licence:

The refuelling procedures and control measures implemented by the Applicant were upgraded and enhanced in order to comply with IPC licence conditions with the Application Site being regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The bogs also have Surface Water Management Plan[6] which define how compliance with the Licences is achieved. No additional control measures, other than compliance with the control measures regulated by the EPA, are considered necessary in terms of protecting groundwater quality. The list below outlines control measures conditioned under the IPC licencing regime, as regulated by the EPA:

- Effective spill/leak management of mobile fuelling units was undertaken;
- Replacement (and remediation where necessary) of all underground fuel tanks was undertaken;
- There was no other emissions to water of environmental significance;
- All tank and drum storage areas were rendered impervious to the materials stored therein. In addition, tank and drum storage areas was bunded;
- Drainage from bunded areas was 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 was 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 was carried out in designated areas protected against spillage and leachate run-off;
- While awaiting disposal, all materials were collected and stored in designated areas protected against spillage and leachate run-off;
- Except for roof water, all surface water discharges from workshop areas were fitted with oil interceptors;
- An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water was carried out weekly;
- The Applicant undertook a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines were tested at least every three years; and,

[6] *Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf*

- The Applicant maintained (in storage) an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

8.6.2.1.4 Contamination of Surface Water by Leakages and Spills

Accidental spillage of petroleum hydrocarbons during refuelling of machinery and plant (static and mobile) construction plant with petroleum hydrocarbons is a significant pollution risk to surface waters and associated ecosystems and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in the death of aquatic organisms.

Discharges from wastewater systems (septic tanks) at office buildings, and at welfare facilities and workshops could potentially have caused surface water contamination. Activities and features associated with peat extraction include railway lines, machine passes, canteen structures, work sites, welfare facilities, mobile fuel tanks, fixed fuel tanks, peat loading facilities, and end-user sites. These potential impacts existed for all 5 no. bogs and their associated production centres and workshops, but we understand from a review of available Annual Environmental Reports, (AERs) submitted to the EPA under the IPC licence, reports that no significant pollution events/spills to groundwater have occurred since 2000 (surface water is dealt with separately in this rEIAR).

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Control Measures:

Pre-IPC Licence:

Prior to the regulation of activities at the Application Site by the EPA which commenced in 2000, the Applicant were implementing several control measures to reduce the risk of contamination by spills and leakages. These measures primarily relate to the storage of peat harvesting machinery, refuelling procedures and waste management. These measures are the same as those outlined in Section 8.6.2.1.3.

Active IPC Licence:

The Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 since 2000. The bogs also have Surface Water Management Plan[7] which define how compliance with the Licences is achieved. The control measures implemented to reduce to the risk of contamination by spills and leakages are the same as those outlined in Section 8.6.2.1.3.

8.6.2.1.5 Effects on Groundwater Abstractions

Historic impact on the nearby Ballivor PWS can be assessed on the basis of impacts relating to groundwater quality and water quantity (the volume of water available). The Ballivor PWS is the only large abstraction located within 5km of the Application Site. 5km is considered to be a very conservative screening distance considering the shallow nature (3-6m deep) of the peat extraction works and all ancillary activities, particularly the historic bog drainage works.

The Ballivor PWS comprises of 2 no. wells drilled in 1994 and are mapped downgradient of the Application Site with regional groundwater flow generally towards the southeast. At a more local scale,

[7] *Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf*

groundwater flow is likely to be influenced by topography and in the vicinity of the PWS will move in all directions towards the Stonyford River. The aquifer feeding the Ballivor PWS source is Calp Limestone which is overlain by 5-10m of highly permeable limestone derived tills in the vicinity of the well. Groundwater flow to the PWS source is from the north and northwest, within the mapped Inner and Outer Source Protection Areas (SPAs). The Application Site is not located within the mapped SPA area.

The GSI also map several additional private boreholes and wells in the vicinity of the Application Site. These private water supplies are reliant on groundwater flows in the deeper bedrock aquifer underlying the glacial deposits.

Deep groundwater recharge from the Application Site to the underlying bedrock aquifers will have been minimal. The restriction of recharge relates to the generally impermeable layers which underlie much of Irelands' bogs leading to a 4% recharge coefficient for the bogs. Therefore, the majority of the groundwater drainage and seepage in the bogs would have a lateral flow direction, discharging into the perimeter drains and entering the surface water drainage network in the lands surrounding the bogs.

Pathway: Groundwater recharge and groundwater flow paths and site drainage network.

Receptor: Groundwater quality and groundwater quantity.

Control Measures: No control measures would be necessary due to the shallow nature of the works and the nature of the local hydrogeological regime.

8.6.2.1.6 *Effect on Designated Sites*

As previously identified, there is a conceptual link between groundwater and surface water across the bogs, whereby groundwater (entering shallow perimeter drains) and surface water within the bogs primarily drains to surface water bodies situated around the bogs. Pathways (flow routes) with nearby and regionally located (downstream) SAC/SPAs (Natura 2000 sites) were identified by digital tracing/tracking hydrological flow paths between the Application Site and their downstream discharge points on a local and a regional scale. The River Boyne and River Blackwater SAC/SPA is situated along the Deel, Stonyford and Boyne rivers immediately downstream of the Application Site.

Alteration of the hydrological regime at the upstream bogs may have altered flows from the bogs which ultimately discharge to the SAC/SPA. However, the 5 no. bogs (Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West) were drained between 1948 and 1995, before the SAC designation in 2003 and the SPA designation in 2010. The local baseline environment for this SAC/SPA, therefore, included the bogs in their drained state.

Pathway: Surface water drainage network. Drainage from the Application Site discharges to outfall points and streams, which discharge to the River Deel to the west and the Stonyford River to the east. In this area, these river waterbodies form part of the River Boyne and River Blackwater SAC/SPA.

Receptor: River Boyne and River Blackwater SAC/SPA.

Control Measures:

As outlined above the Application Site has been regulated by the EPA under IPC Licence Registration No. P0501 since 2000. In addition, the drainage system has been designed to limit runoff from the site via low-gradient field drains, mains drains, and silt ponds. Control measures relating to the protection of water quality are outlined in Section 8.6.2.1.1 to 8.6.2.1.4 above.

Although surface pathways exist between the bogs and the SAC/SPA, the scale of flows from the bogs is small relative to the scale of flows in the designated site. As outlined in Section 8.4.2, flow volumes along the hydrological flow paths were separated into groups. Surface water flows between 0.01 – 0.1

m^3/s were classified within bog scale flows while sub-catchment to catchment scales flows were classified as being within 10 – 100+ m^3/s. The surface water connections between the Application Site and the SAC/SPA are between 1 and 6km in length and transition from bog scale flows near the bogs to sub-catchment and catchment scale of flows at the SAC/SPA boundaries (i.e., the Deel and Stonyford Rivers, which in turn discharge to the River Boyne, have a much higher volumetric flow).

There are also other activities in all catchments upstream and downstream of the Application Site that have and will contribute to changes in flows and changes in water quality in the receiving water environment (i.e. agriculture, forestry etc).

8.6.2.1.7 *Effect on the WFD Status of Surface and Groundwater Bodies*

The Application Site has been subject to drainage and peat extraction activities and all ancillary works since 1948, *i.e.* for more than 50 years before the WFD existed.

As described above, the primary hydrological and hydrogeological changes associated with the peat extraction activities and all ancillary works process occurs during the initial drainage of the bog in advance of peat extraction activities and all ancillary works. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. At this time, ancillary features were also constructed including railway lines, machine passes, canteens, work sites, production centres, mobile fuel tanks, fixed fuel tanks and peat loading facilities. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. During the Peat Extraction Phase, only minimal landuse change occurs which predominantly relate to minor annual topographic changes (i.e., lower ground levels) caused by ongoing peat extraction activities and all ancillary works. While the timing of drainage and initiation of peat extraction activities and all ancillary works varies across the Application Site, the majority of the Application Site was drained before 1988, with Lisclogher West drained before 1995.

However, there is no requirement to assess the peat extraction activities and all ancillary works at the Application Site which predate 2003 and the transposition of the WFD Directive into Irish Law.

As the 1st WFD cycle was completed in 2010-2015, no WFD status existed for much of the Peat Extraction Phase. However, EPA Q-rating values are available from 2000 to 2020 for all watercourses downstream of the Application Site. The data shows a relatively stable trend in Q-values during this period with the majority of watercourses fluctuating between Q3.5 (“Moderate” Q-status) and Q4 (“Good” Q-status), being either slightly polluted or unpolluted. Only 1 no. waterbody achieved a “High” Q-status (Q4.5) during this period (Boyne_050). These EPA Q-rating values indicate a slight decline in water quality in comparison with the pre-2000 period. However, river waterbodies upstream of the Application Site have experienced a similar trend in Q-ratings (refer to WFD Compliance Assessment Report attached as Appendix 8-4). Therefore, the trend is likely to reflect land-use changes in the wider Boyne catchment rather than any specific peat extraction related activities within the Application Site. Consequently, changes in water quality during this period cannot be attributed solely to peat extraction activities which were being scaled back at this time.

It is considered that with the implementation of the control measures in accordance with IPC Licence Requirements the status of the SWBs throughout this Peat Extraction Phase of the Project were comparable to those recorded in the 1st WFD cycle (2010-2015).

Pathway: Groundwater recharge and surface water runoff.

Receptor: Downstream surface waterbodies and the underlying Athboy ground waterbody.

Control Measures:

Since 2003, the peat extraction activities and all ancillary works at the Application Site were completed under the conditions set out in IPC Licence No. P0501. This IPC Licence came into effect in April 2000

and upgraded and enhanced several pre-existing environmental monitoring and control measures which had been implemented at the Application Site since 1988. These pre-IPC measures largely included the incorporation of silt ponds into the bog drainage system to minimise the concentrations of suspended solids entering local watercourses. Further amendments were made to the IPC conditions in 2003 following the transposition of the WFD into Irish Law. The bogs also have Surface Water Management Plans[8] which define how compliance with the Licences is achieved. Therefore, throughout the Peat Extraction Phase of the Project, peat extraction activities and all ancillary wors have been operating under strict conditions designed to protect downstream water quality and quantity.

The control measures for the protection of surface and groundwater quality/quantity are outlined in full in Section 8.6.2.1.1 to 8.6.2.1.4 above.

8.6.2.2 Current Phase (June 2020 – Present Day)

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction activities and all ancillary works at the Application Site in June 2020 to the present day.

8.6.2.2.1 *Effects of Bog Drainage on Bog Hydrogeology*

No significant effects on bog hydrogeology will have occurred from the cessation of peat extraction activities and all ancillary works in the June of 2020 to the present day. By the June of 2020, all drainage infrastructure (field drains, main drains, silt ponds etc.) would have been in place across the Application Site for between 25 – 70 years. The hydrogeological regime would have been well established with field drains lowering the perched groundwater table in the adjacent former peat production fields.

No additional drainage or deepening of drains would have occurred during this period. The only works completed comprised minor maintenance and minor repairs to the drainage network and silt ponds where required.

Pathways: Groundwater volume and water level drawdown.

Receptors: Peat Bog Hydrogeology

Control Measures:

During this period the Applicant continued to operate the Application Site in accordance with IPC licensing requirements. No further control measures, beyond that implemented to date, are deemed necessary as the conditions, emission limits etc. set out in the IPC licence are designed in accordance with the relevant legislation to ensure ongoing protection of ground and surface waters.

8.6.2.2.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology*

With the cessation of peat extraction activities and all ancillary works, there was less potential for disturbance of peat and elevated concentrations of suspended sediments entering surface watercourses. Similarly, the activity of machinery and plant has been reduced, therefore lowering the potential occurrence of accidental spillages of hydrocarbons.

During this period the site drainage still operated under the same drainage systems as during the operational phase of peat extraction activities and all ancillary works *i.e.* field drains, main drains, silt ponds and discharge outlets etc. Therefore, discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the operational phase.

Pathway: Site drainage and surface water discharge routes.

[8] *Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf*

Receptor: Surface water quality and quantity on down gradient rivers (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Control Measures:

During this period the Application Site continued to operate under IPC licensing requirements with respect to surface water discharge quality and quantity.

8.6.2.2.3 *Contamination of Groundwater by Leakages and Spills*

Despite the cessation of peat extraction activities and all ancillary works at the Application Site, there was still some limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Ballivor Works remained 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 8.6.2.1.3 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the site during the Current Phase.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Local Groundwater Quality.

Control Measures:

Measures that mitigated against contamination of groundwaters are outlined in Section 8.6.2.1.3 and are currently being adhered to at the Application Site.

8.6.2.2.4 *Contamination of Surface Water by Leakages and Spills*

Despite the cessation of peat extraction activities and all ancillary works at the Application Site, there has been some limited activity at the Application Site during the Current Phase (removal of stockpiles and environmental monitoring) involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Ballivor Works 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 8.6.2.1.4 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during this phase.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Control Measures:

Measures that mitigated against contamination of groundwaters are outlined in Section 8.6.2.1.3 and are currently being adhered to at the Application Site.

8.6.2.2.5 *Effects on Groundwater Abstractions*

No effect on local groundwater abstractions will have occurred from the cessation of peat extraction activities and all ancillary works in June 2020 to the present day. Drainage and hydrogeology of the Application Site are unchanged during this period.

Pathway: Groundwater recharge and groundwater flow paths and site drainage network.

Receptor: Groundwater quality and groundwater quantity.

Control Measures:

Any works during this time period have been completed under licence from the EPA and the Applicant's Environmental Management System.

8.6.2.2.6 *Effect on Designated Sites*

Despite the cessation of peat extraction activities and all ancillary works at the Application Site, there is still some very limited activity at the Application Site involving machinery and plant (removal of stockpiles), the maintenance of the existing drainage network and environmental monitoring.

The Application Site remains hydrologically linked with the River Boyne and River Blackwater SAC/SPA. The risks to the receiving waters (in terms of water quantity and water quality) are the same as those outlined in Section 8.6.2.1.6 but to a much lesser extent due to the lower intensity of works being completed at the site. Less activity on-site has decreased the likelihood of pollution incidents or exceedances of discharge limits occurring. The risk is much reduced in comparison to the Peat-Extraction Phase of the Project.

Pathway: Surface water drainage network. Drainage from the Application Site discharges to outfall points and streams, which discharge to the River Deel in the west, the Stonyford River to the east and the River Boyne to the South. In this area, these river waterbodies form part of the River Boyne and River Blackwater SAC/SPA.

Receptor: River Boyne and River Blackwater SAC/SPA.

Control Measures: Any works during this time period have been completed under licence from the EPA and the Applicant's Environmental Management System.

The only works completed comprised minor maintenance and minor repairs to the drainage network and silt ponds where required.

8.6.2.2.7 *Effect on WFD Status of Surface and Groundwater Bodies*

With the cessation of peat extraction activities and all ancillary works, there was less potential for disturbance of peat and elevated concentrations of suspended sediments entering surface watercourses. Similarly, the activity of machinery and plant has been reduced, therefore lowering the potential occurrence of accidental spillages of hydrocarbons.

During this period the site drainage still operated under the same drainage systems as during the operational phase of peat extraction activities and all ancillary works *i.e.* field drains, main drains, silt ponds and discharge outlets etc. Therefore, discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the operational phase.

Therefore, there was little potential for the Current Phase of the Project to effect the WFD status of the receiving waterbodies.

Pathway: Groundwater recharge and surface water runoff.

Receptor: Downstream surface waterbodies and the underlying Athboy ground waterbody.

Control Measures:

During this period the Application Site continued to operate under IPC licensing requirements with respect to surface water discharge quality and quantity.

8.6.2.3 Remedial Phase

8.6.2.3.1 *Effect on Bog Hydrogeological Regime*

The overall aim of the Cutaway Bog Decommissioning and Rehabilitation Plans is to put the bogs comprising the Application Site on a trajectory towards becoming naturally functioning peatlands.

The current drainage system was designed to lower the local water table in each of the bogs to facilitate peat extraction activities and all ancillary works. This lowered peat water table does not support typical bog communities. Therefore, in order to achieve the aims of the Cutaway Bog Decommissioning and Rehabilitation Plans, it will be necessary to alter the drainage regime which currently exists on-site.

Those areas selected for rewetting will experience the greatest change in bog hydrogeology. Rewetting can be achieved through measures such as drain blocking which will encourage natural re-vegetation of the cutaway areas with typical bog communities. More intensive drain blocking will be completed in areas of bare peat whereas less intensive measures will be utilised in areas where habitats are already present. Drain blocking will help establish a more suitable hydrological/hydrogeological regime where the peat water table will be much closer to the surface than it is at present. Post restoration monitoring in other sites has shown that groundwater levels in rewetted bogs can recover relatively quickly *i.e.* within 2-5 years.

The magnitude of this positive effect will vary across the Application Site, dependent on the local intensity of the drain blocking programme where different areas of the site will be deemed more suitable for rewetting.

Pathways: Water volume and peat water level rise.

Receptors: Local peat bog hydrology/hydrogeology.

Mitigation Measures:

No specific mitigation measures are required in relation to the proposed alteration of the existing bog hydrogeology as the proposed measures will have a positive effect on the bog hydrogeology.

Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with the Applicant reporting to the EPA until the IPC Licence is surrendered. All works completed during the Cutaway Bog Decommissioning and Rehabilitation Plans will be done in accordance with 'best practice' procedures and the mitigation measures in relation to the protection of surface and groundwater quality are detailed in Section 8.6.2.3.2 and Section 8.6.2.3.4 below.

8.6.2.3.2 *Effect on Downstream Surface Water Quality*

Whereas draining the Application Site to facilitate peat extraction activities and all ancillary works had an adverse impact on downstream surface watercourses, improvements in flow and water quality can be achieved through bog rehabilitation and rewetting.

One of the successful criteria for rehabilitation, is revegetation of the Application Site. Vegetation will stabilise substrates in the current bare peat fields, thereby reducing the potential for elevated concentrations of suspended solids in site runoff. Additionally, vegetation can quickly stabilise material in blocked drains, further reducing the potential for the entrainment of suspended solids. Whereas the previously bare peat fields acted as a source of sediment and required silt control measures, a rehabilitated bog containing wetland habitats will increase the sites solids retention time. Silt ponds will continue to operate during the early stages of the rehabilitation process and will only be

decommissioned when the Application Site is deemed to be on a trajectory of environmental stability and/or rehabilitation has been completed.

The water quality improvements associated with rehabilitated peatlands are not limited to reduced suspended solid concentrations. International studies have shown a long-term reduction in pollutant concentrations, including nitrate and ammonia, following rewetting in comparison to drained peatlands (Pschenyckyj. C. et al. 2021). While several studies have shown that the magnitude of these positive effects depends on site-specific factors such as the degree of degradation and local peat characteristics, all studies have shown an overall long-term decrease in pollutant concentrations (Negassa et al., 2020).

It is worth noting that some studies have shown a short-term increase in phosphorous and suspended solid concentrations following restoration (Harpenslager et al. 2015 and Koskinen et al, 2017). This short-term increase in pollutants is linked to initial drain-blocking activities before the hydrogeological regime of the Application Site becomes stabilised (Pschenyckyj. C. et al. 2021).

The rehabilitations plans will also improve water attenuation at the Application Site, with the blocked drains slowing the rate at which water moves through the Application Site and the rate at which water enters downgradient rivers.

Following rehabilitation, water will still discharge from the designated emission points. However, as discussed in the above paragraphs, this discharge will be of improved quality and of lower volumes.

Pathway: Site drainage and surface water discharge routes.

Receptor: Surface water quality and quantity on down gradient rivers (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Mitigation Measures:

Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with the Applicant reporting to the EPA until the IPC Licence is surrendered.

The existing drainage systems and silt control measures, which have proven effect, will continue to operate during the early stages of the Cutaway Bog Decommissioning and Rehabilitation Plans when there is the potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements. All onsite activities will be completed in accordance with 'best practice' procedures.

Following implementation of the rehabilitation measures a programme of aftercare and maintenance, designed in accorded to meet the Conditions of the IPC Licence, will be completed at the Application Site. This will comprise of initial quarterly monitoring, with the number of site visits reducing after 2 years to bi-annually and then after 5 years to annual visits. A water quality monitoring program will be established to monitor the impact of rehabilitation on water quality discharge from the bog. The monitoring results will be reported on each year to the EPA with the parameters to be included as follows: monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.

8.6.2.3.3 *Effect of Fertiliser Application on Downstream Surface Water Quality*

The Carranstown Bog – Cutaway Bog Decommissioning and Rehabilitation Plan (2022) includes the targeted application of fertiliser in order to accelerate the establishment on vegetation of bare peat on headlands, on high fields, and within areas of dry cutaway bog.

The application of fertilizer has the potential to enrich downstream surface waters and have a negative impact on local surface water quality.

However, only a very small area of Carranstown Bog (17.57ha) is proposed to be subject to fertilization. This represents approximately ~5.7% of the total area of Carranstown bog and ~0.7% of the total area of the Application Site.

Pathway: Site drainage and surface water discharge routes.

Receptor: Surface water quality on down gradient rivers (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Mitigation Measures:

The Carranstown Bog – Cutaway Bog Decommissioning and Rehabilitation Plan (2022) includes mitigation measures for the application of fertiliser which are summarised below:

- Fertiliser will not be applied on land which is waterlogged, flooded, likely to flood, frozen or covered with snow;
- No fertiliser will be applied when heavy rain is forecast within the succeeding 48 hours;
- No fertiliser will be applied on steeply sloping ground or where there is a rick of water pollution (i.e. the presence of drains); and,
- No fertiliser will be spread on land within 2m of a surface watercourse.

Buffer zones, in accordance with EPA guidelines (www.epa.ie), will be utilised and adhered to in respect of waterbodies during fertiliser application.

8.6.2.3.4 *Effect of Potential Leakages and Spillages on Groundwater Quality*

During the Remedial Phase, there will be some activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. This activity will be greatest during the initial stages of rehabilitation when works associated with rewetting and revegetation such as drain blocking will be completed. Once this work has been completed there will only be very limited activity at the Application Site which will mainly comprise of non-intrusive monitoring and minimal repairs to peat blockages and or additional fertilization to aid the development of successional vegetation communities.

Pathway: Infiltration through pore space in peat, subsoil and bedrock.

Receptor: Peat and subsoil, bedrock.

Mitigation Measures:

The following environmental control measures will be implemented during the remedial measures phase in order to mitigate against leaks and spills:

- All machinery will be regularly checked and maintained prior to arrival at the site;
- Fuelling and lubrication of equipment will only be completed in designated areas and away from surface water features;
- Vehicles will never be left unattended during refuelling;
- All refuelling will occur in mobile fuel bowsers;
- Only dedicated, trained and competent personnel will complete refuelling operations;
- Fuel bowsers will be bunded to 100% capacity to prevent any spills;
- Storage tanks for bowsers and generators will be double-skinned;

- Waste oils and fluids will be collected in leak proof containers and removed from the site for disposal;
- Spill kits will be kept on site; and,
- All activities will be completed in accordance with current 'best practice' procedures.

8.6.2.3.5 *Effect of Potential Leakages and Spillages on Surface Water Quality*

Same as Section 8.6.2.3.4 above.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (R. Deel, R. Stonyford, R. Boyne, and associated tributaries).

Mitigation Measures:

The mitigation measures outlined in Section 8.6.2.3.4 will be implemented and adhered to through the Remedial Phase of the Project and until the IPC Licence for the Application Site is surrendered. These measures significantly decrease the risk of surface water contamination by leaks and spills of hydrocarbons. No further mitigation measures are deemed necessary.

8.6.2.3.6 *Effect on Groundwater Abstractions*

Local groundwater resources are characterised in Section 8.4.13, with no groundwater supplies mapped within the Application Site.

The works associated with the proposed Cutaway Bog Decommissioning and Rehabilitation Plans are all near-surface activities. Therefore, the potential to impact local groundwater supplies (quality and quantity) is negligible.

Pathway: Groundwater recharge and groundwater flow paths and site drainage network.

Receptor: Groundwater quality and groundwater quantity.

Mitigation Measures: With the exception of the protection of groundwater quality from the accidental spillages of hydrocarbons as discussed in Section 8.6.2.3.4, no additional mitigation measures would be necessary due to the shallow nature of the works and the nature of the local hydrogeological regime.

8.6.2.3.7 *Effect on Downstream Designated Sites*

Peatlands and downstream terrestrial aquatic ecosystems are directly linked and while the degradation of the Application Site may have caused a deterioration in habitats and reduced levels of biodiversity in the downstream catchment, rewetting of bogs is linked with improved surface water quality (Section 8.6.2.3.2). Therefore, the proposed Cutaway Bog Decommissioning and Rehabilitation Plans and rewetting of the Application Site will likely improve the quality of aquatic ecosystems such as the downstream designated sites of the River Boyne and River Blackwater SAC/SPA.

Pathway: Surface water drainage network. Drainage from the site discharges to the Deel, Stonyford and Boyne rivers.

Receptor: River Boyne and River Blackwater SAC/SPA.

Mitigation Measures: Any works during this time period have been completed under licence from the EPA and the Applicant's Environmental Management System. These mitigation measures outlined in Sections 8.6.2.3.2, 8.6.2.3.3 and 8.6.2.3.5. The mitigation measures outlined above will be implemented and adhered to until the IPC Licence for the Application Site is surrendered.

8.6.2.3.8 Effect on Surface and Groundwater Body WFD Status

The EU Water Framework Directive (2000/60/EC) requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the Directive is not compromised. Therefore, the Remedial Phase of the Project must not compromise the objectives of the WFD.

The status of the groundwater and surface water bodies in the vicinity and downstream of the Application Site are described in Section 8.4.10 and 8.4.11 respectively.

Potential effects on groundwater and surface water quality and quantity as a result of the Remedial Phase of the Project, in the absence of mitigation measures has the potential to result in a short-term deterioration in the WFD status of surface water bodies in the immediate vicinity of the Application Site. This short-term impact will be associated with the short-term actions phase of the rehabilitation plans during which drain blocking will be completed and there will be increased risk of hydrocarbon spills and entrainment of suspended solids in surface watercourses. However, even in an unmitigated scenario, the long-term effects of the Cutaway Bog Decommissioning and Rehabilitation Plans will have a positive impact on the WFD status of surface waterbodies in the vicinity of the Application Site due to the improved quality of surface water discharge from the site and the improved water attenuation within the Application Site.

The proposed activities on the Application Site during the Remedial Phase of the Project will be limited to near surface activities and due to the local hydrogeological regime of the site being characterised by low groundwater recharge rates, the potential for the Project to impact on the status of the underlying GWB is negligible.

The potential change in WFD status in an unmitigated scenario is summarised in Table 8-20 below and outlined in further detail in the WFD Compliance Assessment attached as Appendix 8-4.

Our understanding of the WFD objectives is that water bodies, regardless of whether they have ‘Poor’ “Moderate” or ‘High’ status, should be treated the same in terms of the level of protection and mitigation measures employed in order to ensure there is no deterioration in the status of a waterbody.

Table 8-20: Summary of WFD Status Change in an Unmitigated Scenario (Remedial Phase)

WFD Element	WFD Code	Current Status (2016-2021)	Assessed Short-term Status	Assessed Long-term Status
Deel(Raharney)_030	IE_EA_07D010200	Good	Moderate/Good	Good/High
Deel(Raharney)_040	IE_EA_07D010300	Good	Good	Good/High
Deel(Raharney)_050	IE_EA_07D010400	Moderate	Moderate	Moderate/ Good
Deel(Raharney)_060	IE_EA_07D010600	Good	Moderate/ Good	Good/High
Boyne_050	IE_EA_07B040800	Good	Good	Good
Boyne_060	IE_EA_07B040900	Good	Moderate/ Good	Good/High
Stonyford_030	IE_EA_07S020100	Poor	Poor	Poor/Moderate
Stonyford_040	IE_EA_07S020400	Moderate	Poor/Moderate	Moderate/ Good
Boyne_070	IE_EA_07B041000	Moderate	Moderate	Moderate
Boyne_080	IE_EA_07B041200	Moderate	Moderate	Moderate
Athboy GWB	IE_EA_G_001	Good	Good	Good

Pathway(s): Surface water drainage and downstream discharge to surface waterbodies. Groundwater recharge to the underlying groundwater body.

Receptor: The following surface waterbodies have been deemed to have the potential to be affected by the Remedial Phase of the Project dur to their proximal location downstream of the surface water emissions points associated with the Application Site (refer to Section 8.4.3.4 and Figure 8-11 to Figure 8-16): Deel (Raharney)_030, Deel(Raharney)_040, Boyne_060, Stonyford_030 and Stonyford_040. The other river waterbodies located downstream of the Application Site do not have the potential to be impacted. Please refer to the WFD Compliance Assessment attached as Appendix 9-6 for a detailed description of the screening process.

In terms of groundwater bodies, the Athboy GWB is the only receptor due to its location directly underlying the Application Site.

Impact Assessment/ Mitigation Measures: Due to the hydrogeological regime at the Application Site, the surface waterbodies directly downstream of the bog discharge locations are deemed to be the most sensitive receptors.

Strict mitigation measures in relation to the protection of surface and groundwaters are outlined above in Section 8.6.2.3.1 to 8.6.2.3.5. The implementation of these mitigation measures during the Remedial Phase of the Project will ensure the qualitative and quantitative status of the receiving surface and groundwaters will not be altered.

Consequently, there will be no change in GWB or SWB status in the underlying GWBs or downstream SWBs (refer to Table 8-21). There will be no change in quantitative (volume) or qualitative (chemical) status, and the downstream SWBs are protected from any potential deterioration from chemical pollution.

As such, the Remedial Phase is compliant with the requirements of the WFD (2000/60/EC).

Table 8-21: Summary WFD Status with the implementation of Mitigation Measures

WFD Element	WFD Code	Current Status (2013-2018)	Assessed Short-term Status	Assessed Long-term Status
Deel(Raharney)_030	IE_EA_07D010200	Good	Good	Good/High
Deel(Raharney)_040	IE_EA_07D010300	Good	Good	Good/High
Deel(Raharney)_050	IE_EA_07D010400	Moderate	Moderate	Moderate/ Good
Deel(Raharney)_060	IE_EA_07D010600	Good	Good	Good/High
Boyne_050	IE_EA_07B040800	Good	Good	Good
Boyne_060	IE_EA_07B040900	Good	Good	Good/High
Stonyford_030	IE_EA_07S020100	Poor	Poor	Moderate
Stonyford_040	IE_EA_07S020400	Moderate	Moderate	Moderate/ Good
Boyne_070	IE_EA_07B041000	Moderate	Moderate	Moderate
Boyne_080	IE_EA_07B041200	Moderate	Moderate	Moderate
Athboy GWB	IE_EA_G_001	Good	Good	Good

8.6.3 Residual Effects

8.6.3.1 Peat Extraction Phase (July 1988 – June 2020)

8.6.3.1.1 *Effects of Bog Drainage on Bog Hydrogeology*

The residual effect of Peat Extraction Phase of the Project is a permanent, moderate, negative, direct, long-term likely effect on the bog hydrogeology. It is intended to implement a Cutaway Bog Decommissioning and Rehabilitation Plans for each of the bogs and this will likely involve drain blocking and other measures to raise the subsurface water levels. The assessment of the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans is provided in Section 8.6.4.

8.6.3.1.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

All activities predating 2000 were unlicensed and no records exist regarding the quality of discharges to nearby surface watercourses. However, by 1988 peat extraction activities and all ancillary works were already well established at the Application Site and while EPA Q-values throughout this phase of the Project fluctuate, there is no clear negative trend in terms of surface water quality between 1988 and 2020. Some improved sediment control measures were installed at the Application Site in the late 1990s and early 2000s and water quality discharge licence limits have been in place since 2000 in accordance with IPC licensing. The available monitoring data indicate that improvements in downstream water quality have not been significant, and this is because there are other activities in the catchment that effect water quality and also that the baseline water quality was reasonably good and has not changed significantly during the Peat Extraction Phase.

The effect on surface water quantity in downstream surface watercourse are not likely to be significant. The drainage systems were designed to reduce runoff to greenfield runoff rates. In addition, runoff from intact raised peat bogs can be quite high when saturated during the winter months.

The residual effect is a moderate, long-term, negative and indirect likely effect on downstream surface water quality and a moderate, long-term, negative and indirect effect on downstream surface water quantity (i.e. river flows).

The cessation of activities and the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans will limit the potential for significant effects into the future and this is assessed below.

8.6.3.1.3 *Contamination of Groundwater by Leakages and Spills*

From a review of the AER reports, we understand that no significant fuel spills or wastewater discharges have occurred since 2000. In addition, extensive control measures have been implemented since 2000 as part of the IPC licence which mitigates against the possibility of any groundwater contamination.

While there are no records to rely on, there does not appear to be any significant issues with hydrocarbons or wastewater discharges to groundwater resulting from the peat extraction activities and all ancillary works prior to IPC regulation (we note that no major issues are referenced in the IPC licence application or in subsequent annual environmental reports).

Therefore, the residual effect on local groundwater quality is imperceptible, long-term, negative, indirect and unlikely.

8.6.3.1.4 *Contamination of Surface Water by Leakages and Spills*

The Applicant did not record (in AER submissions to the EPA) the occurrence of any major significant fuel spills and/or wastewater discharges. In addition, extensive control measures have been implemented since 2000 as part of the IPC licence which mitigate against the possibility of any surface water contamination.

While there are no pre-IPC licence records to rely on, there does not appear to be any significant issues with hydrocarbons or wastewater discharges to surface water resulting from the peat extraction activities and all ancillary works prior to IPC regulation.

The residual effect is a slight, long-term, negative, indirect, unlikely impact on local surface water quality and downstream aquatic ecosystems.

8.6.3.1.5 Effects on Groundwater Abstractions

The potential for the peat extraction activities and all ancillary works to impact the hydrogeology of the Ballivor PWS has been reduced as the bog drainage regime was already largely in place at the time the source boreholes were drilled (1994). The natural hydrological and hydrogeological regime of peat bogs, with little groundwater recharge and high runoff rates, also limit the potential effects that peat extraction activities and all ancillary works may have had on local groundwater abstractions including the Ballivor PWS. The Application Site is not located within the mapped SPA area to the Ballivor PWS. The residual effect is considered to be – Neutral, imperceptible, indirect, long-term, unlikely effect on groundwater quality and groundwater quantity.

8.6.3.1.6 Effect on Designated Sites

The potential for the peat extraction activities and all ancillary works to impact the hydrology of the River Boyne and River Blackwater SAC/SPA has been reduced as the bog drainage regime was already in place at the time of the SAC and SPA designation. Proven and effective control measures have also been implemented to limit the runoff from the Application Site to original greenfield runoff rates. The Application Site has also been operating under IPC licence conditions since April 2000. The residual effect is imperceptible, long-term, negative, indirect likely effect on the hydrology (flows and water quality) of the River Boyne and River Blackwater SAC/SPA.

8.6.3.1.7 Effect on the WFD Status of Surface and Groundwater Bodies

As the 1st WFD cycle was completed in 2010-2015, no WFD status existed for much of the Peat Extraction Phase. However, EPA Q-rating values are available from 2000 to 2020 for all watercourses downstream of the Application Site. The data shows a relatively stable trend in Q-values during this period with the majority of watercourses fluctuating between Q3.5 (“Moderate” Q-status) and Q4 (“Good” Q-status), being either slightly polluted or unpolluted. These EPA Q-rating values indicate a slight decline in water quality in comparison with the pre-2000 period. However, river waterbodies upstream of the Application Site have experienced a similar trend in Q-ratings. Therefore, the trend is likely to reflect land-use changes in the wider Boyne catchment rather than any specific peat extraction activities and all ancillary works within the Application Site. Consequently, changes in water quality during this period cannot be attributed solely to peat extraction activities and all ancillary works which were being scaled back at this time. We consider that with the implementation of the control measures in accordance with IPC Licence Requirements the status of the SWBs during this phase were comparable to those recorded in the 1st WFD cycle (2010-2015).

The Stonyford_030 is the only SWB in the vicinity and downstream of the Application Site to have ever achieved “Poor” status (2016-2021), the remaining SWBs in the vicinity and downstream of the Application Site have achieved either “Moderate” or “Good” status in all WFD cycles. The effect on surface waterbody status is not likely to be significant. The drainage systems were designed to reduce runoff to greenfield runoff rates while the IPC licence controls also ensured high quality runoff from the site.

In addition, the Athboy GWB achieved “Good” status in all WFD cycles and IPC control measures ensured the protection of groundwater quality.

Therefore, we consider that there has been an insignificant, short-term, negative and indirect effect on downstream surface waterbody status and no residual effect on groundwater body status.

A full WFD Compliance Assessment is included as Appendix 8-4.

8.6.3.2 Current Phase (June 2020 – Present Day)

8.6.3.2.1 *Effects of Bog Drainage on Bog Hydrogeology*

The bog hydrogeology remained largely unchanged during this period due to a lack of activity in regard to drainage infrastructure. Therefore, the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on bog hydrogeology.

8.6.3.2.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

No significant effects on downstream surface water hydrology will have occurred from the cessation of peat extraction activities and all ancillary works in June 2020 to the present day. There has been no discernible trend (positive or negative) in Q-values in downstream surface watercourses since the termination of peat extraction activities and all ancillary works in 2020. However, a perceptible positive trend in Q-values would not have been expected given the relatively short time period since peat extraction activities and all ancillary works ceased (~4 years). Therefore, the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on downstream surface water hydrology.

8.6.3.2.3 *Contamination of Groundwater by Leakages and Spills*

From a review of the available AER reports, we understand that no significant fuel spills or wastewater discharges have occurred during this period. Therefore, the residual effect is a negative, imperceptible, short-term, indirect unlikely effect on groundwater quality.

8.6.3.2.4 *Contamination of Surface Water by Leakages and Spills*

From a review of the available AER reports, we understand that no significant fuel spills or wastewater discharges have occurred during this period. Therefore, the residual effect is a negative, imperceptible, short-term, indirect, unlikely effect on surface water quality.

8.6.3.2.5 *Effects on Groundwater Abstractions*

For the reasons outlined above and due to the lower levels of activity onsite during the Current Phase of the Project, that there has not been any residual effect on groundwater abstractions.

8.6.3.2.6 *Effect on Designated Sites*

No significant change in the hydrology of the River Boyne and River Blackwater SAC/SPA will have occurred following the cessation of peat extraction activities and all ancillary works. Due to the reasons outlined above, we consider the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on water quantity and water quality flowing from the bogs towards the River Boyne and River Blackwater SAC/SPA.

8.6.3.2.7 *Effect on WFD Status of Surface and Groundwater Bodies*

No change in the qualitative or quantitative status of the receiving waterbodies will have occurred following the cessation of peat extraction activities and all ancillary works. Due to the reasons outlined above, it is considered that the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on WFD status of downstream surface waterbodies and underlying groundwater bodies.

8.6.3.3 Remedial Phase

8.6.3.3.1 *Effects of Bog Drainage on Bog Hydrogeology*

Following the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation Plans, the bogs will likely be wetter, they will retain more water, they will recolonise with vegetation slowly, and they will eventually become naturally functioning peatlands. As such, we consider the residual effects of the Cutaway Bog Decommissioning and Rehabilitation Plans to be moderate, positive, direct, long-term effect on local peat bog hydrology/hydrogeology.

8.6.3.3.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

Following the implementation of the proposed Cutaway Bog Decommissioning and Rehabilitation Plans, the bogs will be wetter, they will retain more water, they will recolonise with vegetation slowly, and they will eventually become naturally functioning peatlands with much-reduced silt and nutrient output. As such, we consider the residual effects of the Cutaway Bog Decommissioning and Rehabilitation Plans to be a moderate, positive, indirect, long-term effect on downstream surface water hydrology and water quality.

8.6.3.3.3 *Effect of Fertilizer Application on Downstream Surface Water Quality*

The application of fertiliser in the early stages of the Cutaway Bog Decommissioning and Rehabilitation Plans will only occur over a small area of the overall Application Site. Strict mitigation measures have been proposed in regard to the application of fertiliser to ensure surface water quality is not impacted. As such, we consider the residual effects of the proposed fertilisation to be an imperceptible, negative, indirect, short-term effect on downstream surface water quality.

8.6.3.3.4 *Effect of Potential Leaks and Spillages on Groundwater Quality*

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction or development sites. Proven and effective measures to mitigate the risk of spills and leaks will be implemented during the Remedial Phase of the Project. It is considered that the residual effect to be negative, imperceptible, direct, short-term, unlikely effect on groundwater quality.

8.6.3.3.5 *Effect of Potential Leaks And Spillages on Surface Water Quality*

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks will be implemented throughout the Remedial Phase of the Project. Therefore, the residual effect is imperceptible, negative, direct, short-term, unlikely effect on surface water quality.

8.6.3.3.6 *Effect on Groundwater Abstractions*

There will be no effect on groundwater resources and existing abstractions.

8.6.3.3.7 *Effect on Designated Sites*

Due to the reasons outlined above, and with the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans the bogs will likely be wetter, they will retain more water, they will recolonise with vegetation slowly, and they will eventually become naturally functioning peatlands and or wetlands with much-reduced silt and nutrient output. It is considered that consider the likely residual effect to be moderate, positive, indirect, long-term effects on the River Boyne and River Blackwater SAC/SPA.

8.6.3.3.8 *Effect on the WFD Status of Surface and Groundwater Bodies*

Due to the local hydrogeological regime at the Application Site (very limited groundwater recharge), coupled with the implementation of the proposed mitigation measures for the protection of surface water quality, and the additional hydrological benefits associated with bog rehabilitation (improved surface water quality and improved water attenuation), we consider that there will be a slight, positive, long-term, indirect, likely effect on the WFD status of downstream SWBs. There will be no residual effect on the WFD status of the underlying GWB.

8.6.4 Significance of Effects

8.6.4.1 Peat Extraction Phase (July 1988 – June 2020)

8.6.4.1.1 *Effects of Bog Drainage on Bog Hydrogeology*

With the implementation of the control measures, it is considered that there has been a slight effect on local bog hydrogeology as a result of the Peat Extraction Phase of the Project between 1988 and 2020. The significant effects on local bog hydrogeology had occurred prior to 1988.

8.6.4.1.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

For the reasons outlined above, and with the implementation of the control measures, it is considered that there has been a moderate effect on downstream surface water quality as a result of the Peat Extraction Phase of the Project between 1988 and 2020.

8.6.4.1.3 *Contamination of Groundwater by Leakages and Spills*

For the reasons outlined above and with the implementation of the control measures, it is considered that there has not been a significant effect on groundwater quality as a result of leaks and spills during the Peat Extraction Phase of the Project.

8.6.4.1.4 *Contamination of Surface Water by Leakages and Spills*

For the reasons outlined above and with the implementation of the control measures, it is considered that there has not been a significant effect on downstream surface water quality as a result of leaks and spills during the Peat Extraction Phase of the Project.

8.6.4.1.5 *Effects on Groundwater Abstractions*

For the reasons outlined above, it is considered that there has not been a significant effect on local groundwater abstractions during the Peat Extraction Phase of the Project.

8.6.4.1.6 *Effect on Designated Sites*

For the reasons outlined above and with the implementation of the outlined control measures we consider that there has not been a significant effect on the hydrology of the River Boyne and River Blackwater SAC/SPA during the Peat Extraction Phase of the Project.

8.6.4.1.7 *Effect on the WFD Status of Surface and Groundwater Bodies*

With the implementation of the IPC licence controls no significant effects on the status of downstream SWBs or the underlying Athboy GWB have occurred during the Peat Extraction Phase of the Project.

8.6.4.2 Current Phase (June 2020 – Present Day)

8.6.4.2.1 *Effects of Bog Drainage on Bog Hydrogeology*

For the reasons outlined above and with the implementation of the IPC Licence conditions, it is considered that there has not been a significant effect on the local bog hydrogeology during the Current Phase of the Project.

8.6.4.2.2 *Effects of Bog Drainage on Downstream Surface Water Hydrology/Quality*

For the reasons outlined above and with the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on the downstream surface water hydrology during the Current Phase of the Project.

8.6.4.2.3 *Contamination of Groundwater by Leakages and Spills*

For the reasons outlined above and with the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on local groundwater quality during the Current Phase of the Project.

8.6.4.2.4 *Contamination of Surface Water by Leakages and Spills*

For the reasons outlined above and with the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on downgradient surface waterbodies during the Current Phase of the Project.

8.6.4.2.5 *Effects on Groundwater Abstractions*

For the reasons outlined above and with the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on downgradient surface waterbodies during the Current Phase of the Project.

8.6.4.2.6 *Effect on Designated Sites*

For the reasons outlined above and with the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on downgradient designated sites during the Current Phase of the Project.

8.6.4.2.7 *Effect on WFD Status of Surface and Groundwater Bodies*

With the implementation of the IPC Licence conditions it is considered that there has not been a significant effect on WFD status during the Current Phase of the Project.

8.6.4.3 Remedial Phase

8.6.4.3.1 *Effects of Bog Drainage on Bog Hydrogeology*

For the reasons outlined above it is considered that the proposed Cutaway Bog Decommissioning and Rehabilitation Plans will have a significant effect on local bog hydrogeology within the Application Site.

8.6.4.3.2 *Effects on Downstream Surface Water Hydrology/Quality*

For the reasons outlined above it is considered that the proposed Cutaway Bog Decommissioning and Rehabilitation Plans will have a significant effect on downstream water quality and quantity.

8.6.4.3.3 *Effect of Fertilizer Application on Downstream Surface Water Quality*

For the reasons outlined above and with the implementation of the mitigation measures, it is considered that the proposed fertilisation associated with the Cutaway Bog Decommissioning and Rehabilitation Plans will not have a significant effect on downstream water quality.

8.6.4.3.4 *Contamination of Groundwater by Leakages and Spills*

For the reasons outlined above and with the implementation of the mitigation measures, it is considered that there will not be a significant effect on groundwater quality.

8.6.4.3.5 *Contamination of Surface Water by Leakages and Spills*

For the reasons outlined above and with the implementation of the mitigation measures, it is considered that there will not be a significant effect on surface water quality.

8.6.4.3.6 *Effects on Groundwater Abstractions*

For the reasons outlined above it is considered that there will not be a significant effect on groundwater resources and abstractions.

8.6.4.3.7 *Effect on Designated Sites*

For the reasons outlined above and with the implementation of the mitigation measures, it is considered that there will not be a significant effect on groundwater resources and abstractions.

8.6.4.3.8 *Effect on the WFD Status of Surface and Groundwater Bodies*

With the implementation of the mitigation measures outlined above there will be no significant effects resulting from the Remedial Phase of the Project. The Remedial Phase will not result in the deterioration in the WFD status of any surface or groundwater body nor will it jeopardise the attainment of good status in the future.

8.6.5 Cumulative/In Combination Effects

8.6.5.1 Peat Extraction Phase (July 1988 – June 2020)

Indirect cumulative effects can occur via surface water and groundwater flow paths, but these are restricted by connectivity and proximity.

The Application Site is located in the River Boyne surface water catchment. Potential cumulative effects associated with landuse, hydrological and/or hydrogeological changes at the Application Site due to the peat extraction activities and all ancillary works would have had the potential to result in some cumulative effects associated with other activities occurring within the Boyne Catchment over this time period (1988 – 2020).

The assessment of cumulative impacts during the Peat Extraction Phase of the Project is divided as follows:

- Cumulative effects assessment of third party and private peat sod peat cutting (i.e. turbary activities);

- Cumulative effects of agriculture in the surrounding lands; and,
- Cumulative effects of forestry.

The cumulative effects of the Peat Extraction Phase (1988-2020) and the peat extraction and site preparation works which preceded 1988 would have had a profound negative effect on the bog hydrogeological regime whereby vegetation was cleared, drainage inserted, and peat extracted from much of the Application Site. The cumulative effect on downstream surface water quality and flow volumes is not considered to be significant given the control measures being implemented by the Applicant.

8.6.5.1.1 *Cumulative effects of third party and private peat cutting*

Private and third-party peat cutting was being undertaken at the Lisclogher Bog throughout the Peat Extraction Phase of the Project.

Following the Turf Development Act of 1981, the Applicant oversaw a private turf development scheme which provided grants to private bog developers. Third-party sod peat extraction activities and all ancillary works began at Lisclogher Bog in the 1990s and continued until 2020. Over the course of the years, it is estimated that approximately 1,200 tonnes of peat were extracted by third parties from Lisclogher.

The Peat Extraction Phase of the Project would potentially have interacted with these turbary activities and could have contributed to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia. Bog drainage would also have been required for these turbary activities and cumulative impacts on the local bog hydrology may have occurred.

Pathways: Peat drainage and surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers) and bog hydrogeology.

Control Measures:

Control measures relating to the protection of water quality are outlined in Sections 8.6.2.3.1 and 8.6.2.3.2 above.

Impact Assessment:

No control measures beyond those required to comply with the IPC licence conditions were implemented. Control measures were also implemented by the Applicant in an ad hoc manner between 1988 and 2000 by implementation of the pre-existing surface water management system (Refer to Section 8.6.2.2.2).

The areas of third-party peat cutting were small in comparison to the peat extraction activities and all ancillary works completed by the Applicant. The third-party peat cutting was also completed at bog margins.

By 1988 the majority of the Application Site was already artificially drained, with some minor drainage installed on Lisclogher West within the Application Site. Consequently, the continued drainage of these bogs during the Peat Extraction Phase of the Project would have been limited in its potential to alter the hydrological regime in downstream watercourses. However, during the Peat Extraction Phase, there was an ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion of peat sediment via the bog drainage network. This potential pathway would pose a significant risk to local surface water quality, particularly as the River Boyne,

Deel and Stonyford Rivers were all of Extremely High or Very High Importance in 1988. Other water quality parameters of concern are ammonia and Chemical Oxygen Demand (COD).

As outlined, EPA Q-values throughout the Peat Extraction Phase of the Project fluctuate, there is no clear negative trend in terms of surface water quality between 1988 and 2020. Some improved sediment control measures were installed at the Application Site in the late 1990s and early 2000s and water quality discharge licence limits have been in place since 2000 in accordance with IPC licensing. The available monitoring data indicate that improvements in downstream water quality have not been significant, and this is because there are other activities in the catchments that effect water quality and also that the baseline water quality was reasonably good and has not changed significantly during the Peat Extraction Phase of the Project.

Residual Effects: Any third party or private peat cutting completed at the Application Site during the Peat Extraction Phase of the Project (1988 - 2020) would have been infinitely small, in terms of the peat extraction activities and all ancillary works areas and the volumes of peat being removed from the Application Site, in comparison to the Applicant's operations. There are no indications from surface water quality monitoring data that third party peat extraction activities and all ancillary works in combination with the Applicant peat extraction activities and all ancillary works had a significant impact on downstream surface water quality. Therefore, any cumulative effects on local bog hydrogeology and downstream local surface water quality would have been consistent with emerging trends within the downstream catchments when compared to those which would have resulted solely from the large scale, commercial Bord na Móna peat harvesting operations. The residual effect is a moderate, long-term, negative, indirect likely effect on downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Significance of Effects: For the reasons outlined above we consider that there has not been a significant cumulative effect during the Peat Extraction Phase of the Project.

8.6.5.1.2 *Cumulative effects with agriculture*

The Application Site is situated in the Boyne River catchment with agriculture being the largest land use in the surrounding lands and in the wider catchment. Corine land cover maps (1990 – 2018) show that the majority of lands in the Boyne catchment have been used for agricultural purposes during the Peat Extraction Phase of the Project (1988 – 2020).

Agriculture is the largest pressure on water quality in Ireland. Agricultural practices such as the movement of soil and the addition of fertilizers and pesticides can lead to nutrient losses and the entrainment of suspended solids in local surface watercourses. This can have a negative impact on local and downstream surface water quality.

The Peat Extraction Phase of the Project would potentially have interacted with these agricultural activities and could have contributed to a deterioration of downstream surface water quality through the emissions of elevated concentrations of suspended solids and ammonia.

Pathways: Surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Control Measures:

No control measures beyond those required to comply with the IPC licence conditions are deemed necessary. These control measures have been implemented by the Applicant since 2000 and build upon pre-existing surface water management system which was already in operation at the Application Site (1988 – 2000).

Impact Assessment:

The area of the Application Site (24.21km^2) is small in comparison to the total area of the Boyne Catchment (2,694km^2) within which agriculture is the dominant landuse.

By 1988 the vast majority of the Application Site had already been artificially drained. Consequently, the continued drainage of these bogs during the Peat Extraction Phase of the Project would have been limited in its potential to alter the hydrological regime in downstream watercourses. However, during the Peat Extraction Phase, there was an ongoing risk of elevated concentrations of suspended solids and ammonia making their way into downstream surface watercourses via the bog drainage network. This potential pathway would pose a significant risk to downstream local surface water quality, particularly as the River Boyne, Deel and Stonyford Rivers were all of Extremely High or Very High Importance in 1988.

However, while the EPA Q-values throughout the Peat Extraction Phase of the Project fluctuate, there is no clear negative trend in terms of surface water quality between 1988 and 2020. Furthermore, EPA Q-stations located upstream of the Application Site fluctuate in a similar manner indicating that there are other activities in the catchment, including agriculture, which had a greater effect on downstream surface water quality.

Some improved sediment control measures were installed at the Application Site in the late 1990s and early 2000s and water quality discharge licence limits have been in place since 2000 in accordance with IPC licensing. Any cumulative effects will have been reduced in subsequent years with environmental monitoring showing that since 2000, the emission limit for ammonia (2.78mg/l) has only been exceeded on 10 no. occasions while the emission limit for suspended solids has only been exceeded on 6 no. occasions. As discussed in Section 8.4.5.2.2 above, 96% and 97% of the total samples analysed for ammonia and suspended solids have been compliant with the relevant IPC limits. Therefore, if significant cumulative effects were occurring, we would expect to see an improvement in downstream water quality following the implementation of the IPC licence control measures.

However, the available monitoring data indicate that improvements in downstream water quality have not been significant. This indicates that the wider land use in the catchment, which is dominated by agriculture, has a greater effect on surface water quality than the peat extraction activities and all ancillary works within the Application Site and any associated cumulative effects.

Residual Effect: The baseline 1988 environment comprised of a drained peatland located within a largely agricultural catchment. There are no indications from surface water quality monitoring data that peat extraction activities and all ancillary works within the Application Site in combination with agricultural activities in the wider catchment had a significant impact on downstream surface water quality. The EPA Q-values suggest that any cumulative effects were small in comparison to the effects resulting solely from agricultural practices in the wider catchment. Therefore, any cumulative effects on local downstream local surface water quality would have been consistent with emerging trends within the downstream catchments when compared to those which would have resulted solely from the large scale, commercial Bord na Móna peat harvesting operations. The residual effect is a moderate, long-term, negative, indirect, likely cumulative effect on downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Significance of Effects: For the reasons outlined above we consider that there has not been a significant cumulative effect during the Peat Extraction Phase of the Project.

8.6.5.1.3 *Cumulative effects with forestry*

The Applicant's landholdings at the Application Site include approximately 10 hectares of conifer forestry (approximately 8.76ha in Lisclogher-West Bog and 1.78ha in Ballivor Bog) which is managed exclusively by Coillte. These areas of forestry do not fall within the peat extraction bogs and do not form part of the Substitute Consent application.

The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment and impacts from acidification. Forestry may also give rise to modified stream flow regimes caused by associated land drainage.

Due to the close proximity of these areas of coniferous forestry to the Application Site and given that they drain to the same river waterbodies as the Application Site, the potential cumulative impacts on downstream water quality and quantity need to be assessed.

Pathways: Peat drainage and surface water pathways.

Receptors: Surface water quality and quantity in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Control Measures:

No control measures beyond those required to comply with the IPC licence conditions are deemed necessary. These control measures have been implemented by the Applicant since 2000 and build upon pre-existing surface water management system which was already in operation at the Application Site (1988 – 2000).

Impact Assessment:

The areas of conifer forestry were small in comparison to the peat extraction activities and all ancillary works completed by the Applicant.

By 1988 the vast majority of the Application Site had already been artificially drained. Consequently, the continued drainage of these bogs during the Peat Extraction Phase of the Project would have been limited in its potential to alter the hydrological regime in downstream watercourses. However, during the Peat Extraction Phase, there was an ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion of peat sediment via the bog drainage network. This potential pathway would pose a significant risk to local surface water quality, particularly as the River Boyne, Deel and Stonyford Rivers were all of Extremely High or Very High Importance in 1988. Other water quality parameters of concern are ammonia and Chemical Oxygen Demand (COD).

As outlined previously, EPA Q-values throughout the Peat Extraction Phase of the Project fluctuate, there is no clear negative trend in terms of surface water quality between 1988 and 2020. In addition, there is no distinguishable improvement in surface water quality following the implementation of the improved sediment control measures in the late 1990s and early 2000s and the IPC licence control measures in 2000. The monitoring data indicates there are other activities in the catchments which effect water quality and also that the baseline water quality was reasonably good and has not changed significantly during the Peat Extraction Phase of the Project.

Residual Effects: By 1988 peat extraction activities and all ancillary works were already well established across the majority of the Application Site. Therefore, the baseline environment contained peat extraction activities and all ancillary works across much of the Application Site. Any cumulative effects with the commercial forestry activities will have been reduced in subsequent years as the Applicant implemented improved sediment control measures throughout the 1990s and IPC licencing controls in 2000.

EPA Q-values in downstream watercourses fluctuate throughout this phase of the Project, there is no clear negative trend in terms of surface water quality between 1988 and 2020.

Therefore, the cumulative effect of the Peat Extraction Phase of the Project and the forestry activities in the surrounding lands is moderate, long-term, negative, indirect, likely effect on downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Significance of Effects: For the reasons outlined above we consider that there has not been a significant cumulative effect during the Peat Extraction Phase of the Project.

8.6.5.2 Current Phase (June 2020 – Present Day)

8.6.5.2.1 *Cumulative effects with agriculture*

The Application Site is situated within a largely agricultural catchment and any activities within the Application Site have the potential to interact with the agricultural practices in the surrounding lands and could contribute to a deterioration of downstream surface water quality.

The potential effects are similar to those associated with the Peat Extraction Phase of the Project but of a significantly reduced magnitude due to the reduced scale of any works. During this phase of the Project activities onsite are limited to the removal of stockpiles, maintenance of the existing drainage system and environmental monitoring.

Pathways: Surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Control Measures:

All operations completed during this phase of the Project were done in accordance with IPC licence requirements and no additional control measures are deemed necessary.

Residual Effects: There are no indications from EPA Q-values or environmental monitoring data that there has been a significant impact on downstream surface water quality. No cumulative effects have occurred.

Significance of Effects: For the reasons outlined above and with the implementation of IPC licence control measures, we consider that there has not been a significant cumulative effect during the Current of the Project.

8.6.5.2.2 *Cumulative effects with forestry*

The Applicant landholdings at the Application Site include approximately 10ha of conifer forestry and due to the close proximity of these areas of coniferous forestry to the Application Site and given that they drain to the same river waterbodies as the Application Site, the potential cumulative impacts on downstream water quality and quantity need to be assessed.

The potential effects are similar to those associated with the Peat Extraction Phase of the Project but of a significantly reduced magnitude due to the reduced scale of any works. During this phase of the development peat extraction activities and all ancillary works are limited to the removal of stockpiles, maintenance of the existing drainage system and environmental monitoring.

Pathways: Surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers).

Control Measures:

All operations completed during this phase of the Project were done in accordance with IPC licence requirements and no additional control measures are deemed necessary.

Residual Effects: There are no indications from EPA Q-values or environmental monitoring data that there has been a significant impact on downstream surface water quality. No cumulative effects have occurred.

Significance of Effects: For the reasons outlined above and with the implementation of IPC licence control measures, we consider that there has not been a significant cumulative effect during the Current Phase of the Project.

8.6.5.3 Remedial Phase

8.6.5.3.1 *Cumulative effects with Proposed Ballivor Wind Farm*

The Applicant intend to utilise the Application Site for both peatland rehabilitation and wind energy infrastructure in order to facilitate environmental stabilisation of the bog group and to optimise climate action benefits.

The proposed Ballivor Wind Farm is a 26-no. turbine wind farm with development infrastructure proposed on Ballivor, Carranstown, Lisclogher and Bracklin bogs. The overall footprint of the proposed Ballivor Wind Farm is <1.4% of the total area of the Application Site. The Cutaway Bog Decommissioning and Rehabilitation plans for each of these bogs, (with the exception of Lisclogher West which does not contain any proposed Ballivor Wind Farm infrastructure) will be updated to incorporate the proposed wind farm infrastructure, with the key objectives of the Cutaway Bog Decommissioning and Rehabilitation Plans *i.e.* rewetting and revegetation, occurring between and surrounding the proposed wind farm infrastructure.

The EIAR for the proposed Ballivor Wind Farm development details the potential hydrological and hydrogeological issues relating to the construction, operation and decommissioning phases of the proposed wind farm and proposes a suite of best practice mitigation measures designed to ensure that the proposed development does not in any way have a negative impact on downstream surface water quality and quantity.

The main risk to downstream surface water quality and the underlying groundwater quality will occur during the construction phase of the proposed Ballivor Wind Farm development when there is greatest activity on site and large volumes of material being excavated, increasing the potential for elevated concentrations of suspended solids in runoff and heightening the risk of hydrocarbon spillages and leaks. However, extensive mitigation measures will be utilised to protect surface water quality during all phases of the proposed wind farm development. These mitigation measures will utilise and enhance the existing bog drainage network to ensure the proposed development will be in accordance with IPC licence conditions.

During the operational phase of the proposed Ballivor Wind Farm development, the majority of the remedial rehabilitation measures, such as drain blocking, will have been completed and there will be little activity on site with the exception of monitoring and maintenance. The increased surface water runoff associated with the wind farm development infrastructure will be offset by the increased surface water attenuation at the site following the implementation of the remedial measures.

Water quality of discharges from restored peatlands generally improves as a result of bog rehabilitation measures and site restoration. The proposed rehabilitation measures at the Application Site include drain blocking which will improve water attenuation by slowing the movement of water through the Application Site and the release of water downstream. Re-vegetation of the Application Site will stabilise substrates and reduce the risk of elevated concentrations of suspended sediment in downstream watercourses.

Pathways: Peat drainage and surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers) and bog hydrogeology.

Mitigation Measures:

No mitigation measures beyond those required to comply with the IPC licence conditions and those outlined in Sections 8.6.2.3.1 to Section 8.6.2.3.7 are deemed necessary.

It is recommended to complete the Remedial Phase site works (drain blocking etc) and the construction of the wind farm sequentially across the Application Site. This will spread the activity at the site rather than concentrate it in a particular location. Nevertheless, the activities associated with the Remedial Phase site works are low impact in comparison to the construction of the proposed wind farm.

Likely Cumulative Residual Effects: The proposed wind farm development contains a very small footprint within the Application Site. Effective mitigation measures have been proposed for the remedial phase of the proposed development and with the implementation of similar measures for all phases of the potential wind farm development the cumulative residual effect is a moderate, positive effect.

Significance of Effects: For the reasons outlined above we consider that there will not be a significant cumulative effect.

8.6.5.3.2 *Cumulative Effects with Enhanced Rehabilitation Measures (PCAS)*

In addition to the standard remedial measures as detailed in the Cutaway Bog Decommissioning and Rehabilitation Plans for the bogs comprising the Application Site, the Applicant is also committed to enhanced peatland rehabilitation and restoration measures, subject to government funding. Several of the bogs comprising the Application Site have been selected for this enhanced restoration which will comprise of targeted measures designed to rewet the peat. The implementation of PCAS measures will provide greater surface water attenuation and surface water quality benefits in and downstream of the restoration areas. This PCAS measures and the standard remedial measures will have a positive cumulative effect on bog hydrogeology and surface water quality.

Pathways: Peat drainage and surface water pathways.

Receptors: Surface water quality in downgradient waterbodies (i.e. the Deel (Raharney), Stonyford and Boyne Rivers) and bog hydrogeology.

Mitigation Measures: No mitigation measures beyond those required to comply with the IPC licence conditions and those outlined in Sections 8.6.2.3.1 to Section 8.6.2.3.7 are deemed necessary.

Likely Cumulative Residual Effects: The PCAS works will have a positive effect on the local bog hydrogeological environment and the local hydrological environment (in terms of surface water quality and attenuation). The cumulative residual effect is a moderate, positive effect.

Significance of Effects: For the reasons outlined above we consider that there will not be a significant cumulative effect.

8.6.6 Human Health

Due to the nature of the peat extraction activities and all ancillary works process, combined with the control measures and environmental monitoring implemented at the site, no water related impacts on human health have likely resulted from the Peat Extraction Phase nor the Current Phase of the Project.

Furthermore, the Remedial Phase will pose no risk to human health and will likely result in the improvement in local surface water quality.

8.6.7 Monitoring

Environmental monitoring will continue as per the existing IPC conditions until the current IPC licence is surrendered.

This monitoring will encompass surface water sampling to ensure that the discharge from the Application Site remains below the existing IPC emission limit values, thereby protecting downstream surface water quality.

It is also likely that some monitoring will be proposed in order to evaluate the success of the Cutaway Bog Decommissioning and Rehabilitation Plans. This shall include groundwater monitoring in the form of piezometers which will allow for the measurement of the peat groundwater table and assess the impact of the proposed rehabilitation measures, such as drain blocking, which are designed to raise the local peat groundwater table.

8.6.8 Major Accidents and Disasters (MADs)

The main risk of MADs at peatland sites is related to peat stability. However, due to the low-lying and flat nature of the Application Site, slope stability has posed no risk at the Application Site during all phases of the Project.

Flooding can also result in downstream MADs. However, there has been no risk of flooding downstream of the Application Site as a result of the historic and/or proposed activities at the site due to the low-lying nature of the Application Site and the attenuation provided by the on-site drainage system, in particular the presence of the settlement ponds.

There are no other foreseeable MADs.

8.6.9 Conclusions

The Application Site comprises 5 no. Bord na Móna bogs situated between the towns of Kinnegad and Delvin, Co. Westmeath. The bogs comprising the Application Site include Ballivor Bog to the south, Carranstown and Bracklin bogs towards the centre and Lisclogher and Lisclogher West bogs at the northern end of the site. The total Application Site area is approximately 2,421ha (24.21km^2). The current topography of the Application Site is relatively flat with an elevation range of between approximately 69 and 86mOD (metres above Ordnance Datum).

Regionally the Application Site is located in the Boyne surface water catchment. In the west the Application Site drains towards the Deel(Raharney) River, drainage in the north and east is directed towards the Stonyford River while the south of the Application Site drains to the southeast and into the River Boyne. All drainage pathways from the Application Site eventually discharge to the River Boyne.

Currently, the surface of the Application Site is drained by a network of field drains that are typically spaced every 15 to 20m. Larger arterial drains connect the smaller field drains and gently slope towards perimeter silt ponds and surface water outfalls. Surface water outflows from site discharge to small streams which in turn discharge into the Deel (Raharney) River to the west, the Stonyford River to the east and the River Boyne to the south. All outfalls are drained by gravity with no pumping locations situated within the Application Site.

The baseline for our assessment of peat extraction activities and all ancillary works at the Application Site is July 1988, and the Peat Extraction Phase covers the period between 1988 and 2020. The Applicant commenced works at Application Site in 1948. By 1988 peat extraction activities and all ancillary works were well established at Ballivor, Bracklin, Lisclogher and Carranstown. By this time drainage had already been inserted and railway infrastructure had been laid at Ballivor, Carranstown,

Bracklin, and Lisclogher bogs. Lisclogher West was drained between 1973 and 1995. The emerging baseline trend was a drained set of bogs with peat extraction activities and all ancillary works having been ongoing for many years.

As a result, the potential impacts from peat extraction activities and all ancillary works were consistent with the baseline environment, and arising potential impacts on water quality from sediment, hydrocarbons, wastewater are all assessed as having moderate potential impacts. Available water quality data or upstream and downstream watercourses, and discharge water quality monitoring from the bogs, do not indicate any significant impacts on water quality occurred during the Peat Extraction Phase.

Since 2000, the Applicant have been operating the Application Site under IPC Licence requirements. The IPC Licence (P0501-01) sets out several conditions and emission limits designed to ensure the protection of surface and groundwaters.

Peat extraction activities and all ancillary works ceased at the Application Site in June 2020 and our assessment concludes that potential impacts on surface water flows and surface water quality, and groundwater quality are neutral during this period. No changes to the hydrological and/or hydrogeological environments will have occurred from Current Phase of the Project i.e. the cessation of peat extraction activities and all ancillary works to the present day.

The proposed decommissioning and Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site have also been assessed. The plans will generally involve the rewetting and revegetation of the drained bogs. These plans will have a long-term positive effect on the local peat hydrogeology within the site where groundwater tables in the peat bogs are stabilised and closer to the bog surface. These plans will also have positive long-term effects on downstream water quality and regulation of surface water flows.

Our assessment confirms that no significant cumulative effects on the hydrological or hydrogeological environments have resulted from the various phases of the Project. Similarly, no cumulative effects on the hydrological or hydrogeological environments will result from the implementation of the decommissioning and Cutaway Bog Decommissioning and Rehabilitation Plans, nor the proposed wind farm at the Application Site.

9. AIR QUALITY

9.1 Introduction

9.1.1 Background & Objectives

This chapter of the rEIAR describes and assesses the residual direct and indirect air quality impacts of peat extraction activities and all ancillary works, at the Application Site. The air quality impact assessment has been prepared for both the Peat Extraction Phase, the Current Phase and the Remedial Phase of the Project. The baseline environment has been prepared with reference to published air quality data from the Environmental Protection Agency (EPA). For the purposes of this assessment, while the activities associated with the Project assessed have occurred over the past decades, beginning in 1988 and continuing to present day, impacts have been assessed against the most recently published air quality standards which are likely more stringent than historical standards from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards.

9.1.2 Statement of Authority

This chapter of the rEIAR has been prepared by the following staff of AWN Consulting Ltd:

Ciara Nolan

Ciara Nolan (Senior Air Quality Consultant) holds a BSc(Eng) in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). Ciara has over 7 years of experience in the field of air quality consultancy. She has prepared the air quality and climate EIAR chapters for a range of developments including wind energy, industrial, pharmaceutical, data centre, residential and commercial.

9.1.3 Project Description

A full description of the Project is provided in Chapter 4. A brief summary pertaining to Air Quality of the Project Phases, as detailed in Section 4.2.1 in Chapter 4, is provided in the following sections.

9.1.3.1 Peat Extraction Phase: July 1988-June 2020

Site preparation works including the implementation of drainage channels commenced at the Application Site in 1948. This was followed by an industrial peat extraction which continued across four of the five bogs over the following decades. The majority of the Application Site was drained by 1988 and peat extraction activities and all ancillary works were active across much of the Application Site at that point. From 2003 onwards, peat extraction was limited to Ballivor, Carranstown and Bracklin Bogs before ceasing completely in June of 2020. Dust emissions and vehicle and machinery exhaust emissions were the primary impacts to air quality as a result of the peat extraction activities and all ancillary works.

9.1.3.2 Current Phase: June 2020 to present day

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on the Application Site is much reduced with respect to the Peat Extraction Phase. On site activities are

limited to removal of the existing peat stockpiles from Bracklin, Carranstown and Ballivor Bogs and transportation off site which was completed in 2023. Other activities ongoing during the Current Phase include environmental and ecological monitoring associated with the IPC Licence requirements. There are some vehicle and machinery related exhaust emissions associated with the current works, primarily as a result of the removal of the existing peat stockpiles. Exhaust emissions have the potential to impact air quality, however, to a lesser degree than during the Peat Extraction Phase. In addition, there will be some minor dust emissions associated with the removal of the current peat stockpiles which will impact air quality. However, these dust emissions will be significantly less than those during the Peat Extraction Phase.

9.1.3.3 Remedial Phase

It is a requirement of 'Condition 10 Cutaway Bog Rehabilitation' of the EPA Licence that following decommissioning of use of all or part of their bogs, Bord na Móna, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Decommissioning and Rehabilitation Plan – see Appendix 4-2 for details.

There will likely be minimal use of diggers to assist in drain blocking activities, however, due to the short-term duration of the drain blocking activities and the low volume of machinery involved (likely 1 no. digger and 1 no. tractor per bog) impacts to air quality from exhaust emissions will be imperceptible. Ecologists and site managers will visit the Application Site regularly for monitoring purposes which will also result in air emissions from vehicles, however these will be minimal due to the low number of vehicles required.

9.2 Methodology

9.2.1 EPA Description of Effects

The significance of effects of peat extraction activities and all ancillary works will be described in accordance with the EPA guidance document *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), May 2022.* Details of the methodology for describing the significant of the effects are provided in Chapter 1 – Introduction.

The effects associated with the peat extraction activities and all ancillary works are described with respect to the EPA guidance in the relevant sections of this chapter.

9.2.2 Assessment Criteria

9.2.2.1 IPC Licence Criteria

There are no statutory limits on dust deposition and the focus is on the prevention of nuisance and minimising air borne dust emissions where practicable. Although coarse dust is not regarded as a threat to health, it can create a nuisance by depositing on surfaces. Condition 5 of the Integrated Pollution Control Licence Reg No P0501-01 issued to Bord na Móna Energy Limited in April 2000 is specific to Emissions to Atmosphere, including dust emissions. The following conditions apply:

5.2 The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

5.3 Within three months of the date of grant of the licence, the licensee shall submit to the Agency for agreement, a proposal for the identification and monitoring of Dust Sensitive Locations (DSL's) on and off site for dust deposition. A report on this monitoring shall be submitted annually as part of the AER.

5.4 Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].

The dust emission limit value of 350 mg/m^2/day is applicable to the Peat Extraction Phase, Current Phase, and Remedial Phase of this assessment.

9.2.2.2 Air Quality Standards

In addition to the above licenced condition in relation to dust emissions and dust deposition, emissions of nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) also have the potential to impact air quality at sensitive locations as a result of activities associated with the Peat Extraction Phase, the Current Phase and Remedial Phase.

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) addresses sulphur dioxide, oxides of nitrogen, particulate matter and lead;
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002);
- The third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004); and,
- The fourth Daughter Directive[1], published in 2004, relates to polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air and was transposed into Irish law by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2009 (S.I. No. 58 of 2009).

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives;
- New air quality objectives for particulate matter less than 2.5 micrometers (µm) referred to as $PM_{2.5}$ including the limit value and exposure concentration reduction target;
- The possibility to discount natural sources of pollution when assessing compliance against limit values; and,
- The possibility for time extensions of three years for particulate matter less than 10µm (PM_{10}) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

The CAFE Directive is transposed into Irish legislation by the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022). These regulations supersede the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), which previously superseded the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of

[1] *IEEP Fourth Daughter Directive 2004. Available at: https://ieep.eu/publications/the-fourth-air-quality-daughter-directive-impacts-and-consequences-of-mandatory-limits/*

2004), and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

The Air Quality Standards Regulations 2022 set similar or more stringent limit values in relation to the air pollutants outlined in the previous directives and also set limit values in relation to $PM_{2.5}$. The ambient air quality standards applicable for PM_{10} and $PM_{2.5}$ outlined in Directive 2008/50/EC have been used in this assessment to determine the impact of the Project in the Peat Extraction Phase, and Current Phase on air quality as these are more stringent than previous limits thus ensuring a conservative approach for the assessment (see Table 9-1).

Air quality impacts are assessed at sensitive receptors off-site (see Section 9.2.3 in relation to assessment study area). Sensitive receptors for the purposes of this assessment are any occupied dwelling house, hostel, health building or place of worship and may include areas of particular scenic quality or special recreational amenity importance. Areas of ecological importance where designated species may be adversely impacted by dust soiling are also considered sensitive locations.

Table 9-1 Ambient Air Quality Standards Defined in Directive 2008/50/EC [Note 1]

Pollutant	Limit Type	Value
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
	Annual limit for protection of human health	40 µg/m^3
	Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
	Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	Annual limit for protection of human health	20 µg/m^3

[Note 1] EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

9.2.3 Study Area

In relation to potential dust impacts, the IAQM Guidance states that dust impacts to people and property can occur up to 250m from the source. In addition, the guidance states that dust impacts to vegetation can occur up to 50m from a site and 50m from site access roads, up to 250m for a site entrance (IAQM, 2024). As a result, the study area with respect to dust impacts extends to 250m from the Application Site boundary for the purposes of this assessment (hereafter referred to as the 'Study Area'). Figure 9-1 shows the sensitive receptors within the Study Area.

In relation to air quality impacts from vehicle emissions, the TII PE-ENV-01106 guidance (TII, 2022) states that a detailed air quality assessment is required where there are sensitive receptors (human or ecological) within 200m of affected road links. However, as noted in Section 9.2.4.1 below a detailed assessment of traffic related air emissions has been screened out of this assessment as the changes in traffic are below the threshold requiring a detailed assessment.

For the purposes of this assessment, high sensitivity receptors to dust soiling or dust-related human health effects are regarded as residential properties where people are likely to spend the majority of their time, schools, hospitals and residential care homes. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. In relation to potential dust related ecological impacts, high sensitivity receptors are designated areas of conservation (either Irish or European designation) and where dust sensitive species are present.

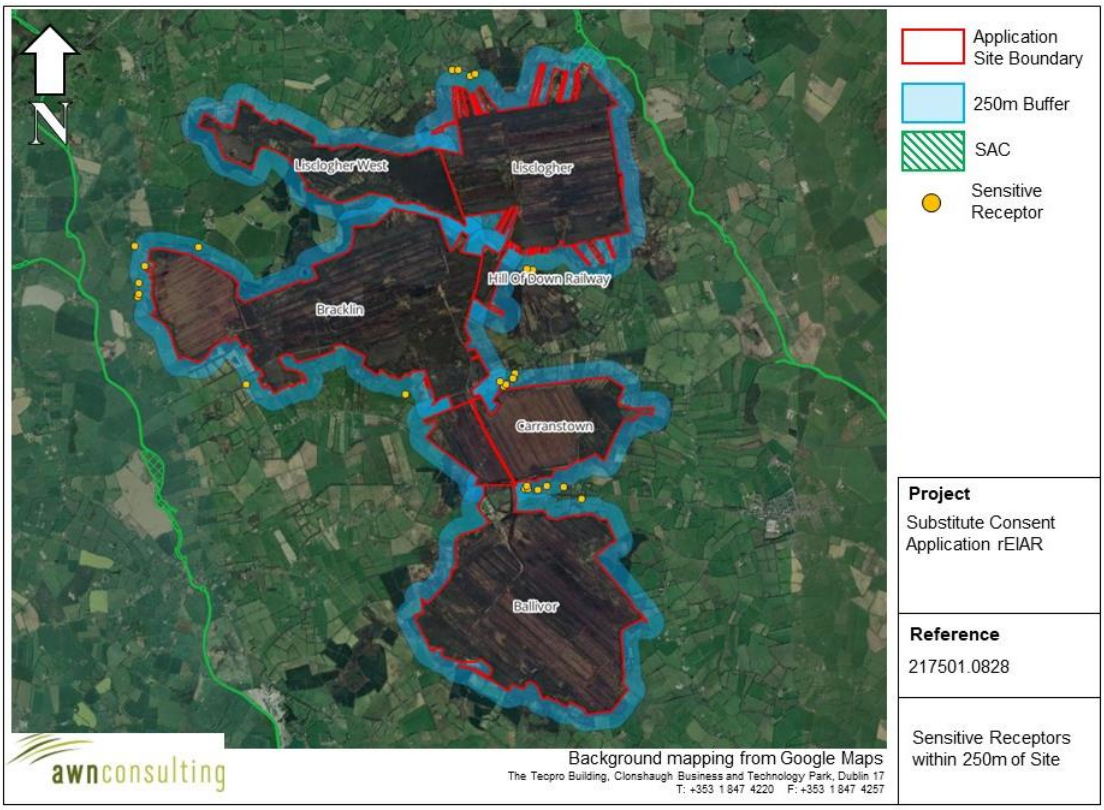


Figure 9-1 Sensitive Receptors within 250m of Application Site

9.2.4 Assessment Methodology

With respect to air quality, dust deposition impacts affecting nearby human or ecological receptors as a result of the harvesting, movement and transport of peat, is the most significant impact identified as part of this assessment. In addition, a high-level review was conducted of the potential impact due to traffic emissions of the transportation of peat from the Application Site via a rail link.

9.2.4.1 Vehicle Emissions

Emissions from cars, Heavy Goods Vehicles (HGVs) (including tractors and excavators) and railway movements associated with the operational activities have the potential to impact local air quality. The Transport Infrastructure Ireland (TII) scoping criteria outlined in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) can be used to determine the need or otherwise for a detailed air quality assessment. The TII guidance is specific to TII road and infrastructure projects, however the criteria can be applied to any development that causes a change in traffic and is considered best practice guidance.

The TII guidance (2022) states that a detailed air quality assessment is required where there are sensitive receptors within 200m of impacted road links. The guidance states that road links at a distance of greater than 200m from a sensitive receptor will not influence pollutant concentrations at the receptor. The TII *PE-ENV-01106* guidance (2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

Chapter 14 - Material Assets has been reviewed in order to inform this assessment.

As detailed in Section 14.2.4 in Chapter 14 – Material Assets, the volume of traffic generated through peat extraction activities and all ancillary works through all Project Phases is presented as a percentage of the overall traffic volume recorded at traffic count locations along routes from the Application Site to end destinations. As the exact transportation routes between the Application Site and its end destinations are not known, a direct route has been assumed and/or the nearest TII counter location to the destination site. Similarly, TII traffic data predominantly covers the 2020-2024 period. Historical count data are available for some routes, and where available, have been used. The lowest average annual daily traffic (AADT) count result was used to compare the Project's traffic data in order to illustrate the precautionary scenario, as a conservative measure.

Using this as a basis, and as detailed in Section 14.2.4 in Chapter 14 – Material Assets, the maximum average daily HGV movements over all Project Phases are calculated at 22 per day, and the maximum average Light Goods Vehicle (LGV) daily movements over all Project Phases are calculated at 163 per day. Both of which are lower than the required threshold for the consideration of air quality assessment. The traffic movements generated as a result of the Project were not significant. Therefore, in accordance with the scoping criteria set out above it is not likely that any road would be classified as "affected". An assessment of the annual average traffic movements on traffic and transportation during the Peat Extraction Phase, Current Phase and Remedial Phase can be found in Chapter 14 - Material Assets.

9.2.4.2 Dust Emissions

The greatest potential impact on air quality associated with the Peat Extraction Phase, Current Phase and Remedial Phase of the Project is as a result of dust emissions, PM_{10}/$PM_{2.5}$ emissions and the potential for nuisance dust. Large particle sizes (greater than 75µm) fall rapidly out of atmospheric suspension and are subsequently deposited in close proximity to the source. Particle sizes of less than 75µm are of interest as they can remain airborne for greater distances and can give rise to the potential dust nuisance at the sensitive receptors. This size range can broadly be described as silt.

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts (hereafter referred to as the 'IAQM Guidance'). The IAQM Guidance methodology has been applied to the Peat Extraction Phase, the Current Phase and the Remedial Phase of the Project. This methodology has been used to predict the likely risk of dust impacts as a result of the Project. The use of the IAQM Guidance is recommended by TII in their air quality guidance PE-ENV-01106 (TII, 2022) and is considered best practice.

The major dust generating activities are divided into four types within the IAQM Guidance to reflect their different potential impacts. These are:

- Demolition
- Earthworks
- Construction
- Trackout (movement of heavy vehicles).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. The categories of demolition, construction and trackout are not applicable to the Application Site. The category of earthworks can be applied to the peat extraction activities and all ancillary works as the activities involved would be similar to those required for excavation and earth moving works on construction projects.

9.2.5 Difficulties Encountered

Data pertaining to the baseline year of 1988 were not available in relation to air quality. Published air quality monitoring data from the EPA is available online as far back as 2006. Data for the period 2006 – 2022 was used in the assessment in order to estimate the background air quality in the vicinity of the Application Site.

In relation to the traffic movements which would have generated dust and pollutant emissions over the Project Phases, please see Section 14.1.2 in Chapter 14 – Material Assets for the assumptions and limitations for the traffic and transport assessment in this rEIAR.

9.3 Establishment of Baseline (July 1988)

The baseline environment has been established as July 1988 for the purpose of this assessment. Historical data for air quality from this time period was investigated in order to establish the relevant baseline. However, published data for this exact time period were not available for every source and therefore, data from as far back as possible has been used in establishing the baseline.

9.3.1 Review of EPA Air Quality Monitoring Data

Air quality monitoring programs have been undertaken in the past by the EPA and Local Authorities. The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2024). Monitoring data for the period 2006 – 2022 is available on the EPA website. The results of previous air quality monitoring are published in annual reports by the EPA (EPA, 2023). Data for the monitoring period of January 2020 to December 2020 inclusive has not been used in determining background concentrations for this assessment as monitored background concentrations are not representative due to the Covid-19 restrictions in place at the time.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 no. towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring the Application Site is within the area categorised as Zone D (EPA, 2024). The long-term air monitoring data has been reviewed and used to determine background concentrations for the key pollutants of NO_2, PM_{10} and $PM_{2.5}$ in the region of the Application Site. The background concentrations account for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Representative rural Zone D sites have been reviewed as these are deemed the most appropriate in relation to the location of the Application Site which is in a predominantly rural area. There are monitoring stations in closer proximity to the Application Site however, these were not considered representative sites for background air quality purposes. The closer sites are not within the Zone D category, are suburban monitoring stations and background traffic monitoring stations which are not within a rural setting and therefore, do not represent the background air quality environment in proximity to the Application Site.

Long-term NO_2 monitoring has been carried out at the rural Zone D locations of Kilkitt Co. Monaghan and Emo, Co. Laois with data available for the period 2006 – 2022. Data from 2006 – 2022 has been reviewed in the absence of older historic data. Over the period 2006 – 2022 annual mean concentrations of NO_2 at the rural background stations of Kilkitt and Emo ranged from a maximum of 5 $\mu g/m^3$ to a low of 2 $\mu g/m^3$ (see Table 9-2) (EPA, 2023). The average annual mean concentration for the 2006 – 2022 period is 3.3 $\mu g/m^3$ which is significantly below the annual limit value of 40 $\mu g/m^3$. In addition, there were no exceedances of the 1-hour limit value of 200 $\mu g/m^3$ (18 exceedances are allowed per year). Based on the above information a conservative annual mean baseline concentration of 5 $\mu g/m^3$ has been used in this assessment.

Long-term PM_{10} monitoring has been carried out at the rural Zone D location of Kilkitt Co. Monaghan with data available for the period 2006 – 2022. Over the period 2006 – 2022 annual mean concentrations of PM_{10} ranged from a maximum of 11 µg/m^3 in 2013 to a low of 7 µg/m^3 in 2019 (see Table 9-3) (EPA, 2023). The average annual mean concentration for the 2006 – 2022 period is 8.7 µg/m^3 which is significantly below the annual limit value of 40 µg/m^3. In addition, there were few exceedances of the daily limit value of 50 µg/m^3 (35 exceedances are allowed per year). Based on the above information a conservative annual mean baseline concentration of 11 µg/m^3 has been used in this assessment.

Monitoring of $PM_{2.5}$ is undertaken at the rural Zone D location of Claremorris Co. Mayo. Data is available for the period 2011 – 2022 on the EPA website (EPA, 2024). Annual mean concentrations of $PM_{2.5}$ ranged from 4 - 8 µg/m^3 over the period 2011 – 2022 which are significantly below the annual mean limit value of 25 µg/m^3 (see Table 9-4). Based on this information, a conservative annual mean baseline $PM_{2.5}$ concentration of 8 µg/m^3 was used in this assessment.

While specific pollutant concentrations prior to 2006 are not available it can generally be assumed that historical air quality dating back to 1988 was of a lesser quality than in more recent years. The EPA state that air quality is improving over time (EPA, 2023) as a result of the introduction of various policies and measures particularly in relation to road transport emissions and the use of cleaner fuels and the gradual introduction of hybrid and electric vehicles.

Table 9-2 Trends in Zone D Air Quality – NO_2 ($\mu g/m^3$)

Station	Averaging Period	Year																
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Kilkitt, Co. Monaghan	Annual Mean NO_2 ($\mu g/m^3$)	6	2	4	3	3	3	4	4	3	2	3	2	3	5	2	2	2
	Max 1-hr NO_2 ($\mu g/m^3$)	110	83	108	50	32	65	42	72	38	97	80	25	37	59	18	15	19
	99.8 1-hr NO_2 ($\mu g/m^3$)	54	63	47	23	25	51	29	46	27	-	26	17	22	42	13	11	-
Emo, Co. Laois	Annual Mean NO_2 ($\mu g/m^3$)	-	-	-	-	-	-	-	4	3	3	4	3	3	4	3	4	3
	Max 1-hr NO_2 ($\mu g/m^3$)	-	-	-	-	-	-	-	38	31	34	194	33	91	56	179	64	179
	99.8 1-hr NO_2 ($\mu g/m^3$)	-	-	-	-	-	-	-	27	25	-	36	28	42	28	38	47	-

Table 9-3 Trends in Zone D Air Quality – PM_{10} ($\mu g/m^3$)

Station	Averaging Period	Year																
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Kilkitt, Co. Monaghan	Annual Mean PM_{10} ($\mu g/m^3$)	10	10	10	8	10	9	9	11	9	9	8	8	9	7	8	8	9
	24-hr Mean > 50 $\mu g/m^3$	0	2	1	1	0	1	1	3	2	1	0	0	0	1	0	0	0
	90th%ile of 24-hr Means ($\mu g/m^3$)	22	21	21	14	19	18	16	19	15	18	15	14	15	13	14	13	-

Table 9-4 Trends in Zone D Air Quality – $PM_{2.5}$ ($\mu g/m^3$)

Station	Averaging Period	Year											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Claremorris, Co. Mayo	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)	6	6	8	5	6	6	6	6	4	5	8	6

9.3.2 Dust Deposition Monitoring

Monitoring for dust deposition has been undertaken on the Application Site in the past as a requirement of the IPC licence for the Application Site. The monitoring results are reported in the Annual Environmental Report (AER) each year, which are included as Appendix 4-3 of this rEIAR. Monitoring typically takes place between April to September of each year to correspond to the peat extraction season. Monitoring is conducted at 1 no. location on the Application Site: DM-03 Ballivor. Monitoring results for location DM-03 are available in the AERs for 2001, 2002, 2007 and 2008 – 2020. No dust monitoring was carried out at the Application Site in 2021 and 2022 due to the cessation of the peat extraction in 2020. Table 9-5 details the maximum annual result recorded at the monitoring location as reported in the previous AERs for the Application Site. There were no results detailed in the AER for 2007, however, it was noted that there was an exceedance of the limit value at this location due to an excavator operating directly adjacent to the dust gauge thereby causing a localised non-compliance event. There were no complaints received in relation to dust emissions during this time period. No results were detailed in the AER for 2020 but it was noted that there were no non-compliance events in relation to dust deposition. There have not been any exceedances of the limit value of 350 mg/m^2/day over the period 2008 – 2020. As no extraction was carried out in 2021 or 2022, no dust monitoring took place, however it is assumed no exceedances occurred due to the lack of activity on the Application Site. No complaints pertaining to dust were received in 2021 or 2022. This indicates that dust deposition was not a significant issue at the Application Site. In addition, there is no history of complaints in relation to dust emissions at the Application Site. Based on the average monitoring results at the Application Site, a baseline concentration of 205 mg/m^2/day for dust deposition has been established.

Table 9-5 Maximum Annual Dust Deposition Monitoring Results: Source: Bord na Móna Annual Environmental Reports 2001 - 2021

Sample Period	DM-03 Ballivor	% of limit value
2001	202	58%
2002	37	11%
2007	-	-
2008	98	28%
2009	94	27%
2010	202	58%
2011	309	88%
2012	211	60%
2013	131	37%
2014	205	59%
2015	305	87%
2016	252	72%
2017	350	100%
2018	305	87%
2019	166	47%
2020	-	-
2021	-	-

2022	-	-
No. of exceedances	1	-

9.3.3 Sensitive Receptors

In addition to determining the baseline air quality in the vicinity of the Application Site, it is also necessary to determine the sensitivity of the surrounding Study Area to dust impacts as per the IAQM Guidance. Both receptor sensitivity and proximity to the Project are taken into consideration. The number of receptors with 250m of the Application Site was established using aerial mapping. It is possible that in the 1988 baseline there were fewer properties present than there currently are, however, by basing the assessment on the current property numbers this provides a conservative assessment.

In terms of sensitive receptors there is 1 no. residential property within 50m of the Application Site boundary at Carranstown Bog and there is 1 no. residential property within 50m of the Application Site boundary at Bracklin Bog. There are no high sensitivity residential properties within 50m of the Application Site boundary at the other Bogs; Ballivor, Lisclogher and Lisclogher West. There are a total of 27 no. high sensitivity residential properties within 250m of the Application Site boundary. As per the criteria in Table 9-6 the overall sensitivity of the Study Area to dust soiling impacts is **Low**.

Table 9-6 Sensitivity of the Study Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Source: Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

In addition to sensitivity to dust soiling, the IAQM Guidance also outlines the assessment criteria for determining the sensitivity of the Study Area to human health impacts. The criteria that are taken into consideration are, the current annual mean PM_{10} concentration, receptor sensitivity and the number of receptors affected within various distance bands from any works. For the Project, a conservative estimate of the historical annual mean PM_{10} concentration is estimated to be significantly lower than the 24 $\mu g/m^3$ threshold for annual mean concentrations (Table 9-3). There are 27 no. high sensitivity residential properties within 250m of the Application Site boundary. Therefore, the sensitivity of the Study Area to dust-related human health impacts is considered **Low** as per Table 9-7.

Table 9-7 Sensitivity of the Study Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Annual Mean PM_{10} Background Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	< 24 $\mu g/m^3$	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Background Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Source: Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

The IAQM Guidance also outline the assessment criteria for determining the sensitivity of the area to ecological impacts from dust. The criteria take into consideration whether the receiving environment is classified as a Special Area of Conservation (SAC), a Special Protected Area (SPA), a Natural Heritage Area (NHA) or a proposed Natural Heritage Area (pNHA) as dictated by the EU Habitats Directive or whether the ecological site is a local nature reserve or home to a sensitive plant or animal species. A section of the River Boyne and River Blackwater SAC (site code 002299, Designated in 2003) is within 50m of the north-east corner of the Application Site at Lisclogher Bog. It should be noted that the EU Habitats Directive came into force in 1992 after much of the drainage works, construction works, and a large amount of the peat extraction activities had taken place on the Application Site. Nevertheless, a conservative approach has been taken in this assessment of the Project and as the River Boyne and River Blackwater SAC contains sensitive habitats that may be sensitive to dust deposition, and it is therefore considered a high sensitivity receptor. As per Table 9-8 the sensitivity of the Study Area to dust-related ecological impacts is **Medium**.

Table 9-8 Sensitivity of the Study Area to Ecological Impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Source: Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

9.4 Likely Significant Effects and Associated Mitigation Measures

9.4.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have

remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

9.4.2 Peat Extraction Phase (July 1988 - June 2020)

9.4.2.1 Dust

Identification and Description of Impact

Peat extraction activities and ancillary works would have generated dust impacts at nearby properties within the Study Area (see Section 9.3.1). The milling, harrowing, ridging and harvesting processes would have generated some dust emissions. Dust impacts would have typically occurred within 250m of the Application Site with the majority of deposition occurring within the first 50m. However, it is noted that the stockpiled peat was typically covered once extracted in order to keep the peat dry until required for use, the covering of the peat would have greatly reduced the potential for dust emissions from stockpiled peat. Dust deposition monitoring carried out on the Application Site and reported within the AERs (see Section 9.4.1) indicated that there have been zero complaints in relation to dust emissions and only one non-compliance event (in 2007) over the period 2007 – 2022. The non-compliance event in 2007 related to an excavator operating directly adjacent to the dust gauge thereby causing a localised non-compliance event. Dust emissions reported within the AER are likely somewhat lower than emissions would have been during the initial Application Site peat extraction activities and all ancillary works prior to 1988 but give a good indication as to general dust deposition trends over the past number of years.

As per Section 9.3.4, the Study Area is of low sensitivity to dust soiling and human health impacts. A section of the River Boyne and River Blackwater SAC is considered a medium sensitivity area to dust soiling impacts on vegetation. The peat extraction activities and all ancillary works can be considered under the heading of 'Earthworks' within the IAQM Guidance as the activities involved would be similar to those required for excavation and earth moving works on construction projects. The peat extraction activities and all ancillary works can be classified as large under the IAQM Guidance due to the overall area of the Application Site being greater than the maximum IAQM criteria. Therefore, combining the large dust magnitude with the sensitivity of the Study Area as per Section 9.3.3 results in an overall low risk of dust soiling and dust-related human health impacts associated with the peat extraction activities and all ancillary works as per the criteria in Table 9-9. There was an overall medium risk of dust impacting vegetation within a section of the River Boyne and River Blackwater SAC to the direct north-east of the Application Site boundary at Lisclogher Bog as per the criteria in Table 9-9. Dust emissions from peat extraction activities and all ancillary works were long-term, localised, negative and imperceptible.

Table 9-9 Risk of Dust Impacts – Peat Extraction activities and all ancillary works

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Source: Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Control Measures

Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. High levels of moisture either retained in soil or as a result of rainfall help suppress the generation of dust due to the cohesive nature of water between dust particles. Rain also assists in removing dust from the atmosphere through washout. It is typical to assume no dust is generated under 'wet day' conditions where rainfall greater than 0.2mm has fallen (USEPA, 2006). A review of data for Mullingar metrological station which is located approximately 16km southwest of the Application Site states that there were 209 days (57% of the year) with greater than 0.2mm rainfall annually over a 30-year averaging period (1979 –

2008) (Met Eireann, 2024). Therefore, the majority of the time dust emissions were reduced naturally due to meteorological conditions.

Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. The following control measures were undertaken as part of general site management and daily operation procedures at the Application Site from the onset of extraction in the 1950s to the cessation in 2020.

- Stockpiles were compacted on either side by large rollers drawn by tractors;
- Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
- Avoid extraction during windy weather;
- Keep headlands clean- remove loose peat;
- Drive slow along dusty headlands; and,
- Clean road crossings.

From July 1988 to June 2020, it is considered that the majority of the time, dust emissions were reduced naturally due to meteorological conditions. Condition 5.5 of the IPC licence which came into effect in April 2000 for the Application Site specifies the following dust control measures were to be implemented on the Application Site within 6 months of granting of the licence.

Condition 5 Emissions to Air:

5.5 In relation to Dust Control the licensee shall, within six months of date of grant of this licence, develop and implement procedures to ensure that:

- *shelter belts are planted in sensitive areas,*
- *harvesting in sensitive areas is avoided during windy weather,*
- *where possible machinery use grassed pathways,*
- *headlands are kept clean and free of excessive loose peat,*
- *stockpiles are sheeted where possible,*
- *moving machinery maintains slow speeds when travelling along dusty headlands,*
- *when harvesting, the jib is maintained low to the stockpile,*
- *shelter belts are planted around outloading facilities,*
- *road transported peat is adequately covered (sheeted or similar),*
- *wind breaks are planted where-ever possible.*

9.4.2.2 Additional Traffic on Public Roads

Identification and Description of Impact

Precise historical records regarding traffic volumes associated with peat extraction activities and all ancillary works on the Application Site are not available. Therefore, screening out of "affected roads" as per the TII screening criteria (TII, 2022) set out in Section 9.2.3.1 cannot be formally completed. In the absence of detailed information for the period July 1988 – June 2020, traffic movements for the Peat Extraction Phase have been calculated using the average volume of peat carried per truck (HGV) movement against the total volume of peat extracted per year. Similarly, staff personnel movements have been calculated under the precautionary scenario that staff personnel travelled to and from the Application Site by car (or Light Goods Vehicle LGV) every working day. The average HGV movements are calculated to be 22 per day and the average LGV movements are calculated to be 163 per day which fall below the TII criteria to assess air quality impacts from traffic emissions. Consideration should also be given that emissions in vehicles pre 2022 when these scoping criteria were set by TII (TII, 2022) would have been higher so a lower threshold of change in AADT or HGV may "affect" a road link.

According to the TII significance criteria for assessing air quality impacts from traffic emissions, neutral effects are those where there is a change in concentration at a receptor of 5% or less and the background annual mean concentration is 75% or less of the ambient air quality standard. Negative effects are those where there is an increase in annual mean concentration at a receptor that does not constitute a neutral effect.

Therefore, should the TII screening criteria have been exceeded and some roads were deemed "affected", in order for an impact to occur an increase of more than 5% for annual mean NO_2, PM_{10} or $PM_{2.5}$ concentrations would need to occur at a sensitive receptor. In addition, the background pollutant concentrations would need to be over 75% of the standard; this would mean a concentration greater than 30 µg/m^3 for NO_2 and PM_{10} and a concentration greater than 18.75 µg/m^3 for $PM_{2.5}$ based on the current air quality standards (Table 9-1). As per Section 9.3.1, historical background pollutant concentrations for representative locations are significantly below these levels.

The traffic generated as a result of the peat extraction activities and all ancillary works is presented in Chapter 14 - Material Assets. Records indicate that the Derrygreenagh Bog Group, of which the Ballivor Bog Group and thus the Application Site is a subset, supplied peat to the Rhode ESB Power Station, Croghan Briquette Factory, Kilberry and Cúil na Móna when required. Information regarding which bogs supplied which specific end user, quantities of supply, frequency of travel and travel routes are not available. From 1985, peat from the Application Site was also distributed in bulk from the peat loading facility at Ballivor Works to the horticulture industry overseas via Dublin Port. The Application Site generated on average 185 transport runs (HGV and LGV combined) based on 252 working day calendar year for the Peat Extraction Phase. Based on this information it can be concluded that the traffic generated from the peat extraction activities and all ancillary works had an imperceptible impact on the local traffic flows. As per Section 9.2.4.1 none of the road links impacted by the additional traffic meet the TII scoping criteria requiring a detailed air modelling assessment. It is unlikely that traffic associated with the Application Site resulted in air quality impacts that were anything greater than neutral.

Using the assessment significance criteria for impacted road links as set out in the TII PE-ENV-01106 guidance (TII, 2022) in combination with the historical records of background air quality available for Zone D (Section 9.3.1) the worst-case impact with respect to vehicle emissions is considered neutral. This is equivalent to a direct, long-term, negative and imperceptible impact from traffic emissions associated with the peat extraction activities and all ancillary works using the EIA terminology for impact descriptions.

Control Measures

Chapter 4 outlines general control measures that were in place on site prior to 2000 with the implementation of the IPC licence and the measures imposed with the granting of the IPC licence for the site. In relation to vehicles and machinery, the below measure was enacted on the Application Site:

- Site vehicles and machinery were regularly inspected and serviced to ensure they were in good working order.

9.4.3 Current Phase (June 2020 – Present Day)

Identification and Description of Impact

During the Current Phase (June 2020 to present day), the activity on the Application Site is much reduced due to the cessation of the peat extraction. The activity was primarily limited to removal of the existing peat stockpiles off the bogs which was completed in 2023. The material was taken via tipper trucks for loading onto lorries and transported off the Application Site. There was the potential for dust emissions associated with the removal of stockpiled peat. The dust control measures stipulated within the IPC licence for the Application Site are required to be in place to avoid potential dust issues. As

mentioned, dust emissions typically occur within 250m of works areas with the majority of deposition occurring within the first 50m. There are a total of 10 no. sensitive residential receptors within 250m of the Application Site at Bracklin Bog, of which 1 no. is within 50m. There are a total of 4 no. sensitive residential receptors within 250m of the Application Site, at Ballivor Bog, none of which are within 50m (see Figure 9-1). Due to the low number of sensitive receptors and the minimal works involved in removing the stockpiled peat from the Application Site, dust emissions are predicted to have been imperceptible.

Other elements of the Current Phase are the environmental and ecological monitoring and a meteorological mast, neither of which generate significant air emissions.

Control Measures

The dust control measures outlined under condition 5.5 of the IPC licence for the Application Site (see Section 9.4.2.2) are required to be implemented throughout the Application Site until the licence is surrendered.

9.4.4 Remedial Phase

Identification and Description of Impacts

There are minimal works involved in the Remedial Phase that have the potential to impact air quality. The primary activities will involve re-vegetation of the Application Site, drain blocking and re-wetting of the bogs where possible. Ongoing monitoring of the Application Site will continue to ensure stabilisation of the Application Site and complete re-vegetation.

As per Section 9.3.3 the Study Area is of low sensitivity to dust soiling and dust-related human health impacts and medium sensitivity to dust soiling of vegetation within a section of the River Boyne and River Blackwater SAC. These sensitivities are also applicable to the Remedial Phase. There is a worst-case low risk of dust soiling and dust-related human health impacts as a result of dust emissions during the Remedial Phase and a medium risk of dust soiling impacts to vegetation in the section of the River Boyne and River Blackwater SAC. The impact to air quality from dust emissions will be short-term, negative and imperceptible.

It has been assumed that there will be 1 no. digger and 1 no. tractor required per bog for a short-term duration to assist in drain blocking activities. Emissions from site machinery and vehicles accessing the site during the Remedial Phase will result in a neutral impact to air quality due to the low volume of vehicles involved (see Chapter 14 - Material Assets).

Control Measures

The dust control measures outlined under condition 5.5 of the IPC licence for the Application Site (see Section 9.4.2.1) should be implemented throughout the Remedial Phase of the Application Site to ensure dust emissions are minimised until the licence is surrendered.

9.5 Residual Effects

9.5.1 Peat Extraction Phase: July 1988 - June 2020

9.5.1.1 Dust

The peat extraction activities and all ancillary works would have led to some dust emissions with the potential to cause soiling and human health impacts at nearby sensitive receptors. It has been established that the peat extraction activities and all ancillary works had an overall **Low Risk** of dust soiling and human health impacts and a **Medium Risk** of dust soiling impacts on vegetation within a section of the River Boyne and River Blackwater SAC. As part of the IPC licence for the Application Site a number of dust control measures were required to be implemented. In addition, dust monitoring was required to ensure dust emissions were not causing issue at nearby sensitive receptors. As per Section 9.3.2 dust monitoring results available for the period 2008 – 2022 indicated there were no exceedances of the emission limit value of 350 mg/m^2/day at the monitoring location on the Application Site and therefore dust emissions were not causing a nuisance in the Study Area. In addition, there is no history of complaints in relation to dust emissions. It can be concluded that the activities on site in conjunction with the dust control measures implemented did not lead to any significant air quality impacts on the local environment. The peat extraction activities and all ancillary works had a long-term, localised, negative and imperceptible impact on air quality.

9.5.1.2 Additional Traffic on Public Roads

Emissions from vehicles during the Peat Extraction Phase would have impacted air quality. The impact of additional vehicles on the local road network was considered with reference to the TII screening criteria outlined in their PE-ENV-01106 guidance document (TII, 2022). It was concluded that the worst-case impact of traffic emissions associated with peat extraction activities and all ancillary works was long-term, localised, negative and imperceptible.

9.5.2 Current Phase (June 2020 – Present Day)

There are a low number of sensitive receptors within close proximity to the Application Site. With the implementation of the dust control measures stipulated withing the IPC licence for the Application Site, dust emissions associated with the Current Phase will be imperceptible.

Due to the low volume of vehicles and machinery involved in the Current Phase, exhaust emissions are predicted to have an imperceptible impact on air quality.

9.5.3 Remedial Phase

Residual impacts to air quality during the Remedial Phase will be short-term, neutral and imperceptible.

9.6 Significance of Effects

9.6.1 Peat Extraction Phase (July 1988 - June 2020)

9.6.1.1 Dust

Impacts to air quality were long-term, localised, negative and imperceptible with respect to dust emissions.

9.6.1.2 Additional Traffic on Public Roads

The impact of traffic emissions associated with peat extraction activities and all ancillary works was direct, long-term, negative and imperceptible.

9.6.2 Current Phase (June 2020 – Present Day)

No significant impacts to air quality are predicted during the Current Phase. Impacts are short-term, negative and imperceptible with respect to air quality.

9.6.3 Remedial Phase

No significant impacts to air quality are predicted for the Remedial Phase. Impacts will be short-term, neutral and imperceptible.

9.7 Cumulative and In-Combination Effects

There is the potential for cumulative impacts to air quality as a result of the proposed Ballivor Wind Farm, the permitted Bracklyn Wind Farm and the rehabilitation plans for the Application Site. Dust emissions associated with the construction phase of the Ballivor and Bracklyn Wind Farm developments may occur in combination with dust emissions associated with the drain blocking activities as part of the rehabilitation plans for the Application Site should these activities occur at the same time. These cumulative emissions have the potential to impact nearby residential receptors. However, dust control measures will be in place during the Remedial Phase and dust mitigation measures will be implemented throughout the construction phase of the wind farm developments. Therefore, significant cumulative dust impacts to nearby receptors are not predicted. Cumulative dust emissions will be short-term, negative and slight.

Due to the low volume of vehicles and machinery involved in the Remedial Phase cumulative air quality impacts associated with vehicle emissions from the construction or operation of the wind farm developments are not predicted.

There is no potential for cumulative impacts to air quality as a result of the peat extraction activities and all ancillary works from 1948 – 1988. Similar impacts to those described for the Peat Extraction Phase July 1988 – June 2020, would have occurred, however, these impacts did not coincide and therefore, cumulative impacts to air quality did not occur.

9.8 Conclusion

This chapter of the rEIAR describes and assesses the residual direct and indirect air quality impacts of the peat extraction activities and all ancillary works, at the Application Site. The air quality impact assessments have been prepared for the Peat Extraction Phase, the Current Phase and the Remedial Phase.

For the purposes of this assessment, while the activities associated with the Project assessed have occurred over the past decades, beginning in 1988 and continuing to present day, impacts have been assessed against the most recently published air quality standards which are likely more stringent than historical standards from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards.

The baseline environment has been established with reference to published air quality data from the Environmental Protection Agency (EPA). Historic air quality monitoring data from the EPA for the pollutants nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) for representative rural locations was reviewed. The air quality in the region of the Application Site is of generally good quality with concentrations of pollutants below the ambient air quality standards. Historic dust deposition monitoring results for the Application Site indicate that dust nuisance is not an issue in the Study Area and no complaints regarding dust deposition have been recorded. Air quality has continued to improve in recent years as a result of the implementation of national plans and policies.

Peat Extraction Phase (July 1988 – June 2020)

Dust emissions during peat extraction activities and all ancillary works had the potential to impact nearby human and ecological sensitive receptors. The Study Area was deemed of low sensitivity in relation to dust soiling and dust related human health impacts. The Study Area is considered of medium sensitivity in relation to dust related ecological impacts due to the presence of the River Boyne and River Blackwater SAC. It was determined that there was an overall low risk of dust soiling and human health related dust impacts and a medium risk of dust related ecological impacts. As part of the IPC licence for the Application Site a number of dust control measures were required to be implemented. In addition, dust monitoring was required to ensure dust emissions were not causing issue at nearby sensitive receptors, the results of which indicated that dust emissions from site works were insignificant.

Vehicle exhaust emissions from vehicles accessing the Application Site and transporting peat from the Application Site also had the potential to impact air quality. The historical traffic figures were reviewed, and it was determined that the traffic generated from the peat extraction activities and all ancillary works had an imperceptible impact on the local traffic flows.

The impact to air quality as a result of the Peat Extraction Phase was assessed to be long-term, negative, localised and imperceptible.

Current Phase (June 2020 – Present Day)

During the Current Phase (June 2020 to Present Day), the activity was limited to removal of the existing peat stockpiles off the bogs which was completed in 2023. The material was taken via tipper trucks for loading onto lorries and transported off the Application Site. There was the potential for dust emissions associated with the removal of stockpiled peat. The dust control measures stipulated within the IPC licence for the Application Site are required to be in place to avoid potential dust issues. Due to the low number of sensitive receptors and the minimal works involved in removing the stockpiled peat from the Application Site, dust emissions are predicted to have been imperceptible.

Due to the low volume of vehicles and machinery involved in the Current Phase, exhaust emissions are predicted to have an imperceptible impact on air quality.

Impacts will be short-term, negative and imperceptible with respect to air quality.

Remedial Phase

There are minimal works involved in the Remedial Phase that have the potential to impact air quality. The primary activities will involve re-vegetation of the Application Site, drain blocking and re-wetting of the bogs where possible. There is a worst-case low risk of dust soiling and human health impacts as a result of dust emissions during the Remedial Phase and a medium risk of dust soiling impacts to vegetation in the section of the River Boyne and River Blackwater SAC. The impact to air quality from dust emissions will be short-term, negative and imperceptible.

Emissions from site machinery and vehicles accessing the Application Site during the Remedial Phase will result in a neutral impact to air quality due to the low volume of vehicles involved.

Impacts to air quality during the remedial phase will be short-term, neutral and imperceptible.

10. CLIMATE

10.1 Introduction

10.1.1 Background & Objectives

This chapter of the rEIAR describes and assesses the residual direct and indirect climate impacts of peat extraction activities and all ancillary works, at the Application Site. The climate impact assessments have been prepared for the Peat Extraction Phase, the Current Phase and the Remedial Phase of the Project. The baseline environment has been prepared with reference to published climate data from the Environmental Protection Agency (EPA) and Met Éireann. For the purposes of this assessment, while the activities assessed have occurred over the past decades, beginning in 1988 and continuing to present day, impacts have been assessed against the most recently published climate guidance and policies which are likely more stringent than historical policies from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards.

10.1.2 Statement of Authority

This chapter of the rEIAR has been prepared by the following staff of AWN Consulting Ltd:

Ciara Nolan

Ciara Nolan (Senior Air Quality Consultant) holds a BSc (Eng) in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). Ciara has over 7 years of experience in the field of air quality consultancy. She has prepared the air quality and climate EIAR chapters for a range of developments including wind energy, industrial, pharmaceutical, data centre, residential and commercial.

10.1.3 Project Description

A full description of the Project is provided in Chapter 4. A brief summary pertaining to Climate for the Project Phases, as detailed in Section 4.2.1 in Chapter 4, is provided in the following sections.

10.1.3.1 Peat Extraction Phase: July 1988-June 2020

Site preparation works including the implementation of drainage channels commenced at the Application Site in 1948. This was followed by industrial peat extraction activities and all ancillary works which continued across four of the five bogs over the following decades. The majority of the Application Site was drained by 1988 and peat extraction activities and all ancillary works were active across much of the Application Site at that point. From 2003 onwards, peat extraction activities and all ancillary works was limited to Ballivor, Carranstown and Bracklin Bogs before ceasing completely in June of 2020. The loss of carbon sink potential of the land was the primary impact to climate as a result of the peat extraction activities and all ancillary works.

10.1.3.2 Current Phase: June 2020 to present day

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on the Application Site is much reduced with respect to the Peat Extraction Phase. On site activities are limited to removal of the existing peat stockpiles from Bracklin, Carranstown and Ballivor Bogs and transportation off site which was completed in 2023. As peat extraction activities and all ancillary works

has ceased on the Application Site, there are no further carbon losses and associated climate impacts as a result of the Current Phase.

10.1.3.3 Remedial Phase

It is a requirement of 'Condition 10 Cutaway Bog Rehabilitation' of the EPA Licence that following decommissioning of use of all or part of their bogs, Bord na Móna (i.e., the Applicant), prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Decommissioning and Rehabilitation Plan – see Appendix 4-2 for details.

There will be minimal use of diggers to assist in drain blocking activities, however, due to the short-term duration of the drain blocking activities and the low volume of machinery involved (likely 1 no. digger and 1 no. tractor per bog) impacts from exhaust emissions will be imperceptible. Ecologists and site managers will visit the Application Site regularly for monitoring purposes. There is no requirement for climate criteria for the remedial phase. The rewetting of the bogs will aid in restoring the carbon store function and promote the carbon sink potential of the land.

10.2 Methodology

10.2.1 EPA Description of Effects

The significance of effects of peat extraction activities and all ancillary works will be described in accordance with the EPA guidance document *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), May 2022.* Details of the methodology for describing the significant of the effects are provided in Chapter 1 – Introduction.

The effects associated with the peat extraction activities and all ancillary works are described with respect to the EPA guidance in the relevant sections of this chapter.

10.2.2 Assessment Criteria

10.2.2.1 Relevant Climate Guidelines, Policies and Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050'* (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'National Transition Objective'. The Act made provision for, *inter alia*, a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council. The Climate Change Advisory Council advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The key duty imposed on planning authorities by Section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) is:

"1) A relevant body [a planning authority] shall, in so far as practicable, perform its functions in a manner consistent with—

(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The CAP 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture. It also outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP 2019 detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second CAP in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022) with an Annex of Action published in March 2023 (CAP23). A fourth revision of the CAP was published in December 2023 – CAP24 (DECC, 2023a).

CAP24 is the second plan to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan follows on from CAP23 with the implementation of the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action reach net zero no later than 2050, as committed to in the Programme for Government. CAP24 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

CAP24 states that rehabilitation of peatlands and development of amenity and tourism opportunities will continue and the plan outlines the following action in relation to meeting the required level of emissions reduction in relation to peatlands:

- Action JM/24/4 Support the restoration and rehabilitation of degraded peatlands.

The EU's Recovery and Resilience Facility, through the National Recovery and Resilience Programme, is investing up to €108 million in the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) to rehabilitate 33,000 ha of peatlands over 82 no. Bord na Móna bogs, previously used for peat extraction activities and all ancillary works, for energy generation.

Key metrics to 2030 highlighted by CAP24 to deliver abatement in wetlands are as follows:

1. *35,900 ha of peatlands to be rehabilitated as part of Bord na Móna EDRRS and LIFE People and Peatlands, and*
2. *30,000 ha of additional exploited peatlands rehabilitated.*

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland 2019b). This was followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021b). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*'. The 2021 Climate Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy*'. The 2021 Climate Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period*'. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to

both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Minister for the Environment, Climate and Communications will request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act states '*a carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*'. The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 10-1. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications will prepare and submit to government the maximum amount of Greenhouse Gas (GHG) emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published July in 2022 and are shown in Table 10-2. The Application Site would likely fall under the heading of LULUCF (Land Use, Land Use Change, and Forestry), this does not yet have an allocated emissions ceiling.

Table 10-1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2035

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 10-2 Sectoral Emission Ceilings 2030

Sector	Baseline (Mt CO_2e)	Carbon Budgets (Mt CO_2e)		2030 Emissions (Mt CO_2e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	**68**				
Unallocated Savings	-	-	26	-5.25	-

Sector	Baseline (Mt CO_{2e})	Carbon Budgets (Mt CO_{2e})		2030 Emissions (Mt CO_{2e})	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

The quantity of carbon released from natural cycles through the earth's atmosphere, waters, soils and biota is much greater than the quantity added by anthropogenic GHG sources. However, the focus of the UNFCCC and the IPCC when setting emissions targets is on anthropogenic emissions because it is these emissions that have the potential to alter the climate by disrupting the natural balances in carbon's biogeochemical cycle and altering the atmosphere's heat-trapping ability. The carbon from biogenic sources such as pristine peatland was originally removed from the atmosphere by photosynthesis, and under natural conditions, it would eventually cycle back to the atmosphere as CO_2 due to degradation processes. Thus, these sources of carbon are not considered anthropogenic sources and do not contribute to emission totals considered in the Kyoto Protocol or EU 20-20-20 targets (IPCC 2006). The altering of the natural balances in carbon's biogeochemical cycle by removing the peat, dewatering, milling and burning of the peat as an energy source is considered an anthropogenic emission.

10.2.2.2 Carbon and Peatlands

A research project undertaken for the Applicant by the Forest Ecosystem Research Group, UCD (Wilson & Farrell, 2007) entitled "CARBAL - *Carbon Gas Balances in Industrial Cutaway Peatlands In Ireland*" investigated the carbon balance in industrial cutover peatlands, where carbon balance was defined as follows:

"Carbon balance: The difference between the amount of C sequestered by the vegetation and that released during autotrophic and heterotrophic respiration, Methane (CH_4) emissions and losses of Diesel Oxidation Catalyst (DOC). Positive values indicate that the ecosystem is a net Carbon (C) sink and negative values indicate ecosystem is a net C source."

The report investigated the post-industrial use of cutover bog with the main options being commercial afforestation, natural regeneration and wetland creation. The report notes that pristine peatlands act as a long-term CO_2 sink due to the persistently high-water table which creates conditions whereby the amount of CO_2 fixed by the peatland vegetation during photosynthesis (P_G) is greater than that released during ecosystem respiration (R_{TOT}) and the net ecosystem exchange (NEE) define as the difference between uptake and release ($P_G - R_{TOT}$) is positive (Wilson & Farrell, 2007).

The report also notes that pristine peatlands are also a significant source of atmospheric CH_4 accounting for around 23% of global emissions. Again, the position of the water table is important with a decrease in CH_4 emissions associated with a lower water table. For pristine peat, plant mediated transport is the most important pathway for CH_4 movement from the anoxic peat to the atmosphere accounting for between 50-97% of total CH_4 transported (Wilson & Farrell, 2007).

In relation to harvested peatlands, CO_2 dynamics undergo significant changes when a peatland is exploited for its fuel resource. Drainage ditches, to facilitate industrial extraction of peat, lower the water table and reduce the moisture content of the peat from approximately 95% to 80%. The removal of the acrotelm layer at the surface and associated vegetation to facilitate the harvesting of peat leads to the removal of the C sequestering capability of the system. This transforms the peatland into a significant source of CO_2. However, the installation of drainage ditches and the removal of the vegetation layer at the surface results in reduced or zero CH_4 emissions (or even a CH_4 sink) due to the increased oxic zone as the water table is lowered and due to the absence of easily degraded C substrate previously provided by the peatland vegetation and the conduit for CH_4 that is provided by aerenchymatic plants (Wilson & Farrell, 2007).

The report also reviewed some studies that found that it was possible to return the C sink function in a relatively short period of time following the cessation of harvesting provided the water table was maintained close to the surface to minimise losses of CO_2 from degradation of the residual peat and the recolonization of the bare peat substrate occurred quickly. The report also found that rewetting and the return of vegetation also resulted in renewed emissions of CH_4 albeit at much lower levels than reported for nearby pristine peatlands (Wilson & Farrell, 2007).

The wetland creation study (Wilson & Farrell, 2007), based on the creation of a 60ha lake, found that the annual CO_2-C balance (tCO_2-C ha^{-1} yr^{-1}) was negative for all microsites (i.e. a source of C). In relative to CH_4 fluxes, emissions were highest in summer periods due to higher soil temperatures and increased supply of substrates with lower winter levels due to a higher water table. However, recolonization by vegetation is recognised as an essential first step on the road to long term C accumulation in terms of C fixation (photosynthesis). The study concludes that maintaining the water table close to the surface is essential as aerobic decomposition occurs up to 10,000 times faster than anaerobic decomposition. In addition, a high-water table has the dual effect of reducing CO_2 emissions and will also promote recolonization by appropriate wetland vegetation and, over time, may lead to the return of the CO_2 sink function. The study also notes that the long-term objective for wetland creation, with regard to the annual C balance, is to reach a point where the losses of CH_4 are offset by CO_2 uptake (Wilson & Farrell, 2007).

Research in Ireland (Wilson et al, 2015) has investigated a range of both industrial and domestic Irish bogs, in order to determine country-specific emission factors. The results of the study indicated that the emission factors ranged from 1.7 (±0.47) and 1.64 (±0.44) t CO_2-C ha^{-1} yr^{-1} for the industrial and domestic sites respectively which is considerably lower than the Tier 1 EF in the IPCC 2013 Wetlands Supplement. The study found that the variation in emission factors was largely controlled by differences in soil temperature between the sites. Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers.

10.2.3 Assessment Methodology

The following methodology has been employed in order to calculate the carbon emissions associated with peat extraction activities and all ancillary works from 1988 – June 2020, in order to present a precautionary scenario, the full 1988 year has been utilised for these calculations rather than for a 6-month period (i.e from July 1988 to December 1988). All calculations in relation to carbon emissions have been undertaken by the Applicant (see Appendix 10-1).

Peat extracted and exported off site

The Applicant's production records describe annual sales of peat from the bogs over the production period. With an average moisture content of 53.8%[1] and assuming a carbon content in peat of 49%[2] the annual average amount of carbon lost from the extraction of peat is then estimated at:

(1-0.538) × 0.49 × annual tonnage = Exported peat tCO_2-eq yr^{-1}

Emissions to atmosphere

For estimation of the total emission of greenhouse gases, the following information in Table 10-3 from Evans et al. (2017) is utilised.

1 As measured by customers of Lorry sales between 2012 and 2019.
2 Wilson et al. (2013) p.12

Table 10-3 Emission factors for extractive peatlands from Evans et al. (2017) (Table 4.1, pp. 39 therein). All values given as tCO_2-eq $ha^{-1}yr^{-1}$.

	Direct CO_2 (Evans et al. 2017)	CO_2 from DOC (IPCC 2014)	CO_2 from POC (Evans et al. 2016)	Direct CH_4 (Evans et al. 2017)	CH_4 from ditches (IPCC 2014)	N_2O Direct (Evans 2017) + Indirect (IPCC 2006)
Industrial Extraction	6.44	1.14	5.00	0.20	0.68	0.38
Domestic Extraction	4.73	1.14	0.89	0.20	0.68	0.27

(a) Direct CO_2 from production areas

The production areas of across the Application Site are determined during each production period.

The estimated average annual amount of direct CO_2 atmospheric emissions is therefore:

Total Production area (ha)×6.44 = Total emitted Carbon tCO_2-eq yr^{-1}

(b) Methane (CH_4) from drains/ditches

The total combined length of drainage ditches in the peat extraction areas of the Application Site was estimated. For the purposes of the calculation, it is assumed that each drain is a consistent 1m in width, The total emission arising from the drains is calculated as:

(Overall Length of Drain x Width of drains) (ha) x 0.68 = Carbon emission tCO_2-eq ha-$1yr^{-1}$

(c) Methane from Production areas

The average annual amount of direct methane CH_4 from the milled peat extraction areas is determined based on the peat extraction areas:

Total Production Area (ha) ×0.2 = Carbon emission tCO_2-eq yr^{-1}

(d) Surface Runoff

The emission rates for Dissolved Organic Carbon (DOC) and Particulate Organic Carbon (POC) were combined into an overall emission rate of 6.14 tCO_2-eq ha^{-1} yr^{-1}. The total estimated carbon lost through runoff was determined as follows:

Total Production Area (ha) ×6.14 = Carbon emission tCO_2-eq yr^{-1}

(e) Transport

Between 2009 and 2020 the annual average amount of DERV diesel used by Bord na Móna vehicles at the Application Site was 64,161 litres. The average annual quantity of agricultural diesel used was 121,701 litres. Using conversion factors for "Gasoil/Diesel" provided by SEAI[3] (43,308 MJ/t, 1,183 L/t, 7.33×10^{-5} tCO_2/MJ) the annual average amount of CO_2 generated by Bord na Móna machinery at Application Site during this period was 498.8 tCO_2 yr^{-1}. This figure was utilised along with the average

3 https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/

tonnes of peat harvested during the same period (58,415tonnes) to establish a ratio of 0.00853 tCO_2/tonne of peat harvested. This ratio was then applied to the historical tonnages of peat extracted. The resulting carbon emission is calculated as follows:

Annual Peat Extracted (Tonnes)x0.00853 tCO_2/tonne = Carbon emission tCO_2-eq yr^{-1}

This is a conservative assessment as some of the machinery used to harvest sod peat were powered by a local electrical network (Baggers).

10.2.3.2 Significance Criteria for Climate

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document* (TII 2022) outlines a recommended approach for determining the significance of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (see Table 10-2). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from a project. The significance of GHG effects set out in PE-ENV-01104 (TII, 2022) is based on IEMA guidance (IEMA, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's (2022) '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*'.

The 2022 IEMA Guidance (IEMA, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and,
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects follow a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended IEMA significance determination and TII criteria. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero*[4] *by 2050*".

Significance is determined using the criteria outlined in Table 10-4 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022a)) along with consideration of the following two factors:

[4] Net Zero: "*When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.*" Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 10-4 Climate Assessment Significance Criteria

Effects	Significance Level	Description
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated. • The project has not complied with Do-Minimum standards set through regulation, nor provided reductions required by local or national policies; and • No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	• The project's GHG impacts are partially mitigated. • The project has partially complied with Do-Minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not Significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures. • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

10.2.4 Difficulties Encountered

Historical data for climate for the period 1988 – present day was investigated in order to establish the relevant baseline. However, published data for this exact time period was not available for every source and therefore, data from as far back as possible has been used in establishing the baseline.

10.3 Establishment of Baseline (July 1988)

The baseline environment has been established as July 1988 for the purpose of this assessment. Historical data for climate from this time period was investigated in order to establish the relevant baseline. However, published data for this exact time period was not available for every source and therefore, data from as far back as possible has been used in establishing the baseline. 1990 is typically taken as the historical baseline year by countries when reporting GHG emissions under the United Nations Framework Convention on Climate Change (UNFCCC). Detailed emissions inventories for the full period 1988 to present are not available for the purposes of establishing the full climate baseline for this assessment. Data from 1990 can be considered representative of the baseline conditions in July 1988. In order to frame the July 1988 baseline against the current climate context, and historic climate data, trends in GHG emissions for the period 1990 – 2022 have been discussed in the following section.

10.3.1 Greenhouse Gas Emissions and Climate Baseline

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of GHGs in the atmosphere. These GHGs come primarily from the combustion of fossil fuels in energy use. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of GHGs and combat climate change.

For the purposes of this assessment, the definition for GHGs outlined in Council *Directive 2009/28/EC* on the promotion of the use of energy from renewable sources and amending and subsequently repealing *Directives 2001/77/EC* and *2003/30/EC* (European Parliament and Council of Europe 2009) has been used. In *'Annex V, C. Methodology Point 5'* the relevant GHGs are defined as Carbon Dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) which are also the most significant GHGs. Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in recent years human activities, which have resulted in the release of GHGs, have impacted on the climate (IPCC 2015). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'.

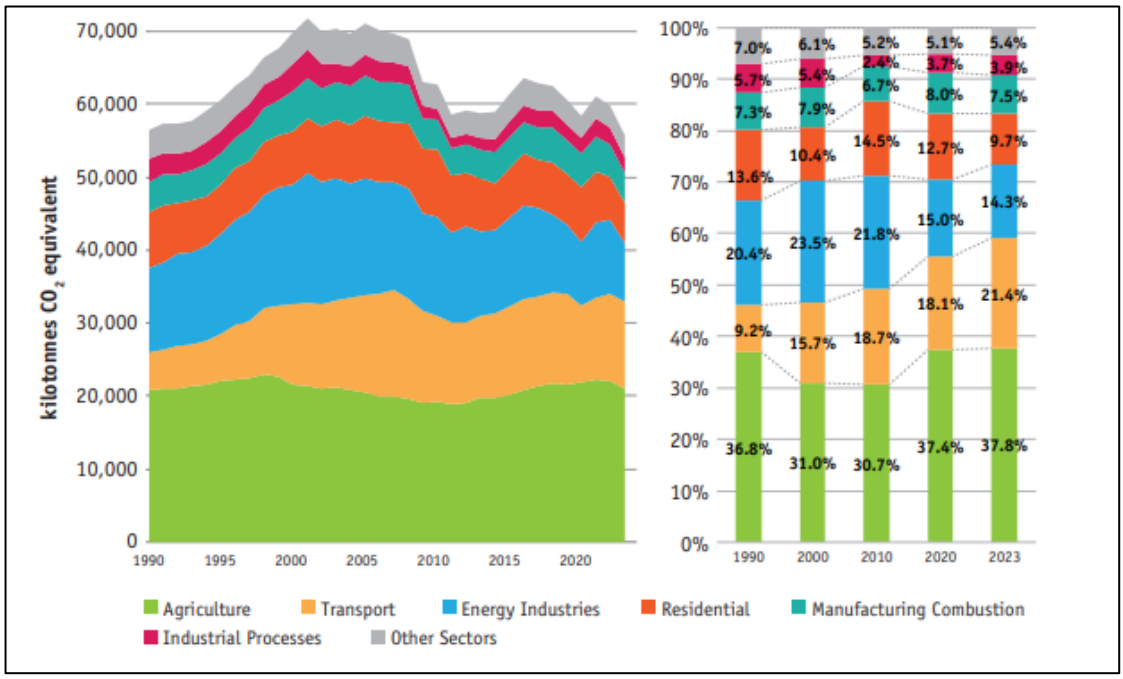
Trends in GHG emissions at a national level are available in annual reports by the EPA. The most recent EPA report entitled '*Ireland's Provisional Greenhouse Gas Emissions 1990 – 2023'*[5] (EPA, 2024) reviews national emissions in 2023 and trends in emissions from 1990.

The EPA reported that GHG emissions in 2023 are 1.2% lower than the historical 1990 baseline for the first time in 33 years. Provisional total national greenhouse gas emissions in 2023 (excluding LULUCF) are estimated to be 55.01 million tonnes carbon dioxide equivalent (Mt CO2eq) which is 6.8% lower (or 4.00 Mt CO2eq) than emissions in 2022 (59.00 Mt CO2eq). The greatest overall increase in emissions is from the Agriculture sector, which accounts for 37.8% of overall emissions (excluding LULUCF); total emissions in this sector were 20.8MtCO2eq, a decrease of 4.6% from 2022. In 2023, Transport sector emissions increased slightly by 0.3% on 2022 and, at 11.8 Mt CO2eq, represent 21.4% of national total emissions. The Energy sector contributed 14.3% of Irelands overall total emissions, however the sector shows a decrease of 21.6% in 2023, the largest annual change in emissions ever recorded for the sector and are now at an all-time low across the 1990 to 2023 timeseries at 7.8 Mt CO2eq. Emissions from the Residential sector have showed a general upward trend in emissions after 1997 due to increased housing stock and growing population. Emissions remained relatively stable over the 2015 to 2019, before peaking in 2020 due to the COVID-19 pandemic. Emissions in 2023 from this sector are 5.35

[5] https://www.epa.ie/publications/monitoring–assessment/climate-change/air-emissions/EPA-Provisional-GHG-Report-Jul24-v6.pdf

MtCO2eq or 9.7% of national total emissions in 2023; 2023 marks the third continuous year of reductions since the start of the COVID-19 pandemic period despite an increasing population.

Figure 10-1 taken from the EPA report (2024) shows the trend in emissions from the largest sectors over the 1990 – 2023 period. It is clear from the EPA report that emissions in 1990, which is representative of the baseline year of 1988, were lower than current GHG emissions in 2023. Therefore, any increase in historical GHG emissions is considered more significant due to the lower baseline levels of GHGs.



Source: Figure 25 EPA (2024) Ireland's Provisional Greenhouse Gas Emissions 1990 - 2023
Figure 10.1 Trend in Emissions for Largest Sectors 1990-2023

In relation to the current climate GHG emissions baseline, and in order to frame the July 1988 Baseline against a current climate context, Ireland's compliance with the EU Effort Sharing Decision (ESD) (EU 2018/842) and the published carbon budgets (Table 10-1), data published in July 2024 (EPA, 2024) predicts that Ireland exceeded (without the use of flexibilities) its 2023 annual limit set under EU's Effort Sharing Decision by 2.27 $MtCO_2e$. Cumulatively from 2021-2023 and after using the ETS flexibility, Ireland is in compliance with the ESR by a net distance to target of 0.15 Mt CO2eq, although in 2023 there is an exceedance of 0.36 Mt CO2eq above its Annual Emissions Allocation with the ETS flexibility. Agriculture and Transport accounted for 76.0% of total ESR emissions in 2023. The sectoral breakdown of 2023 GHG emissions is shown in Table 10-5. The sector with the highest emissions was Agriculture at 48.5% of the total, followed by transport at 27.5%.

Provisional estimates of National greenhouse gas emissions (including LULUCF) in 2023 are 7.8% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021- 2023 Ireland has used 64% (188.4 Mt CO2eq) of the 295 Mt CO2eq Carbon Budget for the five-year period 2021-2025. This leaves 36% of the budget available for the next two years, requiring a substantial 8% annual emissions reduction for 2024 and 2025 to stay within budget.

Table 10-5 Total National GHG Emissions in 2023

Sector	2023 Emissions (Mt CO_2e)	% Total 2023 (including LULUCF)
Agriculture	20.782	34.3%
Transport	11.791	19.5%

Sector	2023 Emissions (Mt CO_2e)	% Total 2023 (including LULUCF)
Energy Industries	7.845	12.9%
Residential	5.346	8.8%
Manufacturing Combustion	4.133	6.8%
Industrial Processes	2.155	3.6%
F-Gases	0.699	1.2%
Commercial Services	0.732	1.2%
Public Services	0.677	1.1%
Waste Note 2	0.846	1.4%
Land Use, Land-use Change and Forestry (LULUCF)	5.614	9.3%
National total excluding LULUFC	**55.007**	**90%**
National total including LULUFC	**60.620**	**100%**

Note 1: Reproduced from Latest emissions data on the EPA website (EPA, 2023)
Note 2: Waste includes emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste.

10.3.2 Meteorological Data

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Mullingar, Co. Westmeath is the nearest weather and climate monitoring station to the site that has meteorological data recorded for the 30-year period from 1979-2008. The monitoring station is located approximately 16 km west of the Application Site. Meteorological data recorded at Mullingar over the 30-year period is shown in Table 10-6. The wettest month was October and the driest month on average was April. July was the warmest month with a mean temperature of 15.2° Celsius. This meteorological data can be considered representative of the weather conditions for the July 1988 baseline.

Table 10-6 Data from Met Éireann Weather Station at Mullingar 1979– 2008: Monthly and Annual Mean and Extreme Values

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9	12.9
mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2	5.7
mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5.0	9.3
absolute max.	13.8	15.4	19.1	21.6	25.0	28.3	29.7	29.1	25.0	20.1	17.3	14.6	29.7
min. maximum	-3.2	-0.6	1.4	4.1	0.0	10.1	10.9	11.4	10.6	6.3	2.7	-1.7	-3.2
max. minimum	11.6	11.5	11.5	12.5	12.7	15.3	17.4	18.0	16.8	15.4	12.5	12.4	18.0
absolute min.	-14.9	-6.6	-8.0	-4.4	-2.6	0.2	3.8	2.1	0.0	-4.4	-6.9	-12.4	-14.9
mean num. of days with air frost	9.9	8.9	5.5	3.1	0.4	0.0	0.0	0.0	0.0	1.5	5.4	8.2	43.0
mean num. of days with ground frost	17.9	16.2	14.0	10.8	5.1	0.8	0.0	0.1	1.7	6.3	12.1	15.4	100.4
mean 5cm soil	3.3	3.3	5.0	8.1	11.8	14.8	16.3	15.5	12.8	8.9	5.7	4.1	9.1
mean 10cm soil	3.7	3.7	5.1	7.6	11.0	14.1	15.8	15.2	12.8	9.3	6.2	4.5	9.1
mean 20cm soil	4.3	4.4	5.8	8.1	11.4	14.3	16.1	15.8	13.7	10.3	7.2	5.2	9.7
RELATIVE HUMIDITY (%)													
mean at 0900UTC	90.8	89.8	87.6	81.9	78.3	79.7	82.1	84.8	87.6	89.9	91.7	91.8	86.3
mean at 1500UTC	83.4	77.8	72.8	68.1	67.1	69.1	69.9	70.6	72.1	77.0	82.2	85.9	74.7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
SUNSHINE (hours)													
mean daily duration	1.8	2.5	3.2	4.9	5.8	5.0	4.6	4.6	3.9	3.2	2.2	1.6	3.6
greatest daily duration	8.2	9.9	10.9	13.6	15.4	15.9	15.3	14.4	12.2	10.1	8.6	7.3	15.9
mean num. of days with no sun	10.3	7.2	5.3	2.9	1.9	2.2	1.8	1.9	3.3	5.7	8.4	11.0	62.0
RAINFALL (mm)													
mean monthly total	91.7	72.0	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2
mean num. of days with >= 0.2mm	19	17	20	15	16	16	16	17	17	19	18	19	209
mean num. of days with >= 1.0mm	15	13	15	11	12	11	11	13	12	14	13	14	154
mean num. of days with >= 5.0mm	6	5	5	4	5	4	3	5	4	6	6	7	60
WIND (knots)													
mean monthly speed	9.0	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
max. gust	67	71	59	56	58	48	48	50	51	59	62	73	58.5
max. mean 10-minute speed	38	36	36	30	34	26	27	28	32	36	32	39	32.8
mean num. of days with gales	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.8
WEATHER (mean no. of days with)													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
snow or sleet	5.0	4.4	3.5	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.7	17.8
snow lying at 0900UTC	2.7	0.9	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	5.7
hail	0.6	0.9	2.0	2.0	1.1	0.2	0.1	0.1	0.1	0.5	0.2	0.3	8.1
thunder	0.1	0.2	0.2	0.3	0.9	0.9	1.2	0.8	0.1	0.1	0.1	0.1	4.9
fog	3.4	3.0	2.4	2.0	1.8	1.3	1.9	2.9	4.0	4.1	4.1	4.3	35.1

10.4 Likely Significant Effects and Associated Mitigation Measures

10.4.1 Do-Nothing Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction activities and all ancillary works was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities and all ancillary works commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction activities and all ancillary works would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

A 'Do-Nothing' option that could be considered is that peat extraction activities and all ancillary works ceased at the Application Site in 1988 and did not continue beyond that point. On this basis, it would be assumed that the peat extraction activities and all ancillary works ceased and that the bog lands were allowed to naturally revegetate with scrub and bog woodland more widespread across the site as is evident from areas of the Application Site which have been out of production for long periods of time.

Subsequently. other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred. However, in the context of the following:

- The legislative mandate given to Bord Na Móna in the form of the Turf Development Act 1946 9as amended) to acquire and develop peatlands;
- The uncertainty in the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works has occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction activities and all ancillary works at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required).

In the event that Substitute Consent is not granted in effect, the "do nothing" represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate and independent of the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, energy development and education are part of Bord na Móna's vision for the Application

Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

10.4.2 Peat Extraction Phase (July 1988 - June 2020)

10.4.2.1 Loss of Carbon Sink

Identification and Description of Impact

Lowering the water table increases the oxidation of the peat and in turn causes a rise in CO_2 emissions, this is further increased by the removal of vegetation and exposure of the peat that was present on the Application Site (Holmgren et al 2006) (Waddington & Price 2000). However, lowering of the water table had already occurred at the Application Site prior to 1988. The effects of drainage may also reduce dissolved and particulate organic carbon retention within the peat. Losses of carbon dioxide due to leaching of dissolved and particulate organic carbon are calculated as a proportion of the gaseous losses of carbon from the peat. The degraded bogs will continue to act as sources of these GHG until either they are rewetted/revegetated, the peat is removed, or all the remaining peat has oxidised. As a result of the draining of the bog and the removal of the vegetation, the peatland transformed from a net CO_2 sink to a net CO_2 source (Wilson 2013).

Using the assessment methodology outlined in Section 10.2.3 the CO_2 emissions associated with the peat extraction activities and all ancillary works over the period 1988 – 2020 were calculated. In total 2,703,053 tCO_2 was released over the 1988 – 2020 period (see Appendix 10-1). Over this 33-year period there was on average 81,911 tonnes of CO_2 per annum released from the Application Site. Annually this equates to 0.03% of Ireland's 2021 – 2025 carbon budget of 295 $MtCO_2e$ or 0.05% of Ireland's more stringent 2030 – 2035 carbon budget of 151 $MtCO_2e$ (see Table 10-1).

There was also the potential for GHG emissions associated with vehicles accessing the Application Site, for peat removal and site workers. However, the number of vehicles accessing the Application Site and their associated GHG emissions were not predicted to be significant in relation to Ireland's climate budgets and sectoral emissions ceilings (Table 10-1 and Table 10-2). GHG emissions from vehicles, in general, would have reduced as engine technologies and fuels improved over the 1988 – 2020 period. However, the primary source of GHG emissions throughout the Peat Extraction Phase was the removal of peat and the subsequent loss of carbon sink.

Control Measures

No control measures in relation to climate were implemented during the Peat Extraction Phase.

10.4.3 Current Phase

Identification and Description of Impact

As peat extraction activities and all ancillary works has ceased at the Application Site since June 2020, carbon losses associated with peat removal and the subsequent impact to climate are not relevant to this phase.

Other elements of the Current Phase are the removal of stockpiled peat, which was completed in 2023, and ongoing environmental and ecological monitoring. There is the potential for some minor GHG emissions associated with vehicles accessing the Application Site for removal of stockpiled peat or for monitoring works. However, the number of vehicles accessing the Application Site will be minimal and

GHG emissions associated with these are not predicted to be significant in relation to Ireland's climate budgets and sectoral emissions ceilings (Table 10-1 and Table 10-2). The impact to climate is short-term, negative and imperceptible which is overall not significant.

Control Measures

No control measures in relation to climate and carbon emissions is relevant for the Current Phase.

10.4.4 Remedial Phase

Identification and Description of Impacts

The primary focus of the rehabilitation phase is re-wetting the bogs which will aid in restoring the carbon store function and promote the carbon sink potential of the land. Research by Wilson et al. (2013) has indicated that rehabilitation of peatlands can mitigate the carbon emitted as part of the historic peat extraction activities and all ancillary works. However, the research notes that the carbon sink potential is not equivalent to the original sink potential of undisturbed peatlands. Large volumes of peat in the Application Site had been removed prior to the baseline year of 1988. Therefore, the carbon sink potential of the land in the baseline scenario was significantly less than the undisturbed peatland. As a result, the re-wetting activities of the rehabilitation phase will have a materially beneficial impact in raising the carbon sink potential of the land when compared to the baseline scenario.

The purpose of the Remedial Phase of the Project is in line with a number of key actions and priorities within the Climate Action Plan 2024 in relation to the rehabilitation of peatlands, specifically those within the mid-lands area. With the restoration of the carbon sink potential of the land, albeit, to a lesser extent than the potential prior to the historic removal of the peat, the Application Site will aid in Ireland's trajectory towards net zero by 2050. The impact to climate is considered long-term, neutral and not significant.

Mitigation Measures

There are no mitigation measures in relation to climate for the Remedial Phase.

10.5 Residual Impacts

10.5.1 Peat Extraction Phase: July 1988 - June 2020

The removal of the carbon store of the Application Site and the subsequent release of CO_2 from the peat extraction activities and all ancillary works resulted in a long-term, negative and significant impact to climate. However, it should be noted that the TII guidance (2022) and IEMA guidance (2022) states that the significance of a project should be assessed on the basis of the project as a whole and not from individual phases.

10.5.2 Current Phase (June 2020 – Present Day)

As all peat extraction activities and all ancillary works have ceased since June 2020 carbon losses associated with peat removal and the subsequent impact to climate are not relevant to this phase. Emissions from vehicles accessing the site will be minimal in nature and will result in a short-term, negative and imperceptible impact to climate.

10.5.3 Remedial Phase

Impacts to climate during the Remedial Phase will be short-term, neutral and not significant.

10.6 Significance of Effects

10.6.1 Peat Extraction Phase (July 1988 - June 2020)

The impact to climate is long-term, negative and significant. The re-wetting of the bog will aid in restoring the carbon sink potential of the land. Research by Wilson et al. (2013) has indicated that rehabilitation of peatlands can mitigate the carbon emitted as part of the historic peat extraction activities and all ancillary works.

10.6.2 Current Phase (June 2020 – Present Day)

As peat extraction activities and all ancillary works has ceased at the Application Site, carbon losses associated with peat removal and the subsequent impact to climate are not relevant to this phase. Emissions from vehicles accessing the Application Site will be minimal in nature and will result in a short-term, negative and imperceptible impact to climate which is overall not significant.

10.6.3 Remedial Phase

No significant impacts to climate are predicted for the Remedial Phase. Impacts will be short-term, neutral and not significant.

10.7 Cumulative and In-Combination Effects

The IEMA and TII guidance on which the assessment is based states that "*the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative*".

The GHG emissions associated with the peat extraction activities and all ancillary works and the loss of the carbon sink potential of the land has been carried out in this assessment with the predicted emissions compared with Ireland's climate targets and emissions ceilings.

Cumulative impacts to climate associated with peat extraction activities and all ancillary works for the 1948 – 1987 period include historic removal of peat and the associated loss of the carbon sink potential of the land. The impact to climate as a result of works at the Application Site from 1948 – 1987 are similar to those discussed for the Peat Extraction Phase July 1988 – June 2020. While no detailed calculations in relation to tonnages of carbon have been conducted for the 1948 – 1987 period, it is likely that the impact to climate was long-term, negative and significant. The cumulative impact of the ongoing peat extraction activities and all ancillary works from the commencement of works at the Application Site in 1948 up until the peat extraction activities and all ancillary works ceased in 2020 likely had a long-term, negative and significant impact on climate.

However, it should also be noted that 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 remediation and wind energy infrastructure and to facilitate environmental stabilisation of the Application Site and the

optimisation of climate action benefits. It is proposed to construct the Ballivor Wind Farm development which includes infrastructure on Ballivor, Carranstown, Lisclogher and Bracklin Bogs on part of the Application Site. It is the intention of the Applicant to integrate the peatland remedial measures with the proposed Ballivor Wind Farm. The cumulative impact of providing a carbon sink within the re-wetted peatland and the carbon savings as a result of renewable energy generated by the proposed Ballivor Wind Farm (should it be granted planning permission) would result in a significant, long-term beneficial impact to climate and would assist in nation goal of achieving a climate neutral Ireland by 2050 as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021.

10.8 Conclusion

This chapter of the rEIAR describes and assesses the residual direct and indirect climate impacts of the peat extraction activities and all ancillary works, at the Application Site. The climate impact assessments have been prepared for the Peat Extraction Phase, the Current Phase and the Remedial Phase.

For the purposes of this assessment, while the activities assessed have occurred over the past decades, beginning in July 1988 and continuing to present day, impacts have been assessed against the most recently published climate guidance and policies which are likely more stringent than historical policies from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the Project, then it is unlikely that significant impacts occurred based on historical standards. The climate impact assessment comprised a quantitative assessment of the carbon emissions as a result of the peat extraction activities and all ancillary works.

Historic climate data was reviewed in reference to Ireland's weather for the surrounding area of the Application Site over the period July 1988 to present day. Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in recent years human activities, which have resulted in the release of GHGs, have impacted on the climate. Climate change has led to an increase in the frequency of extreme weather conditions such as storms, floods and droughts. Historic National greenhouse gas (GHG) emissions published by the Environmental Protection Agency (EPA) were also reviewed and used to inform the climate baseline assessment. National greenhouse gas (GHG) emissions are required to meet EU specific targets, however Ireland's annual GHG emissions have been in exceedance of these targets thus far.

Peat Extraction Activities (July 1988 – June 2020)

The CO_2 emissions associated with the peat extraction activities and all ancillary works over the period 1988 – 2020 were calculated. On average over this 33-year period there was 81,911 tonnes of CO_2 per annum released from the Application Site. Annually this equates to 0.03% of Ireland's 2021 – 2025 carbon budget of 295 $MtCO_2e$ or 0.05% of Ireland's more stringent 2030 – 2035 carbon budget of 151 $MtCO_2e$. The removal of the carbon store of the Application Site and the subsequent release of CO_2 from the peat extraction activities and all ancillary works resulted in a long-term, negative and significant impact to climate. However, the TII and IEMA guidance states that the significance of a project should be assessed on the basis of the project as a whole and not from individual phases.

Current Phase (June 2020 – Present Day)

As peat extraction activities and all ancillary works has ceased since June 2020, carbon losses associated with peat removal and the subsequent impact to climate are not relevant to this phase.

There is the potential for some minor GHG emissions associated with vehicles accessing the Application Site for removal of stockpiled peat or for monitoring works. However, the number of vehicles accessing the Application Site will be minimal and GHG emissions associated with these are

not predicted to be significant in relation to Ireland's climate budgets and sectoral emissions ceilings. The impact to climate is short-term, negative and imperceptible which is overall not significant.

Remedial Phase

The primary focus of the rehabilitation plans is re-wetting the bogs which will aid in restoring the carbon store function and promote the carbon sink potential of the land. The purpose of the Remedial Phase of the Project is in line with a number of key actions and priorities within CAP24 in relation to the rehabilitation of peatlands, specifically those within the mid-lands area. With the restoration of the carbon sink potential of the land, albeit, to a lesser extent than the potential prior to the historic removal of the peat, the project will aid in Ireland's trajectory towards net zero by 2050.

The impact to climate is considered long-term, neutral and not significant.

11. NOISE AND VIBRATION

11.1 Introduction

11.1.1 Background & Objectives

This chapter of the rEIAR assesses the potential for any likely significant effects of noise and vibration arising from the past peat extraction activities and all ancillary works, at Ballivor, Bracklin, Carranstown, Lisclogher, and Lisclogher West bogs (hereafter "the Application Site"), during the Peat Extraction Phase, the Current Phase and the Remedial Phase. The Application Site which is the subject of this substitute consent application to An Bord Pleanála, in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended).

Noise impact assessments have been prepared for the Peat Extraction Phase, the Current Phase, and the Remedial Phase of the Project at the nearest Noise Sensitive Locations (NSLs) to the Application Site. To inform this assessment, background noise levels have been measured at several locations, representative of the nearest NSLs in the vicinity of the Application Site to assess the potential impacts associated with the peat extraction activities and all ancillary works at the Application Site.

The activities at the Application Site operate under an Integrated Pollution Control licence from the EPA (Reg. P0501-01; hereafter the "IPC Licence") which sets noise emission limits. NSLs in this context are any occupied dwelling house, hostel, health building or place of worship and may include areas of particular scenic quality or special recreational amenity importance. In this instance all of the NSLs are dwellings.

It is important to note that in the case of environmental noise in general, once a noise-generating activity has ceased, any environmental noise effects also stop, and there is no effect which persists after the noise has stopped.

11.1.2 Statement of Authority

This chapter of the rEIAR has been prepared by the following staff of AWN Consulting Ltd:

Mike Simms

Mike Simms (Senior Acoustic Consultant) holds a BE and MEngSc in Mechanical Engineering and is a member of the Institute of Acoustics (MIOA) and of the Institution of Engineering and Technology (MIEI). Mike has worked in the field of acoustics for over 19 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, wind energy, industrial, commercial and residential.

Dermot Blunnie

Dermot Blunnie (Senior Acoustic Consultant) holds a BEng (Hons) in Sound Engineering, MSc in Applied Acoustics and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He has been working in the field of acoustics since 2008 and is a member of the Institute of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA). He has extensive knowledge and experience in relation to commissioning noise monitoring and impact assessment of wind farms as well as a detailed knowledge of acoustic standards and proprietary noise modelling software packages. He has commissioned noise surveys and completed noise impact assessments for numerous wind farm projects within Ireland.

11.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Section 2.6 of Chapter 2 of the rEIAR.

11.2 Fundamentals of Acoustics

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. To take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB). The audible range of sounds expressed in terms of SPL is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3 dB. The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. The 'A-weighting' system defined in the international standard, BS ISO 226:2003 Acoustics. Normal Equal-loudness Level Contours has been found to provide the best correlations with human response to perceived loudness. SPLs measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 11-1. For a glossary of terms used in this chapter please refer to Appendix 11-1.

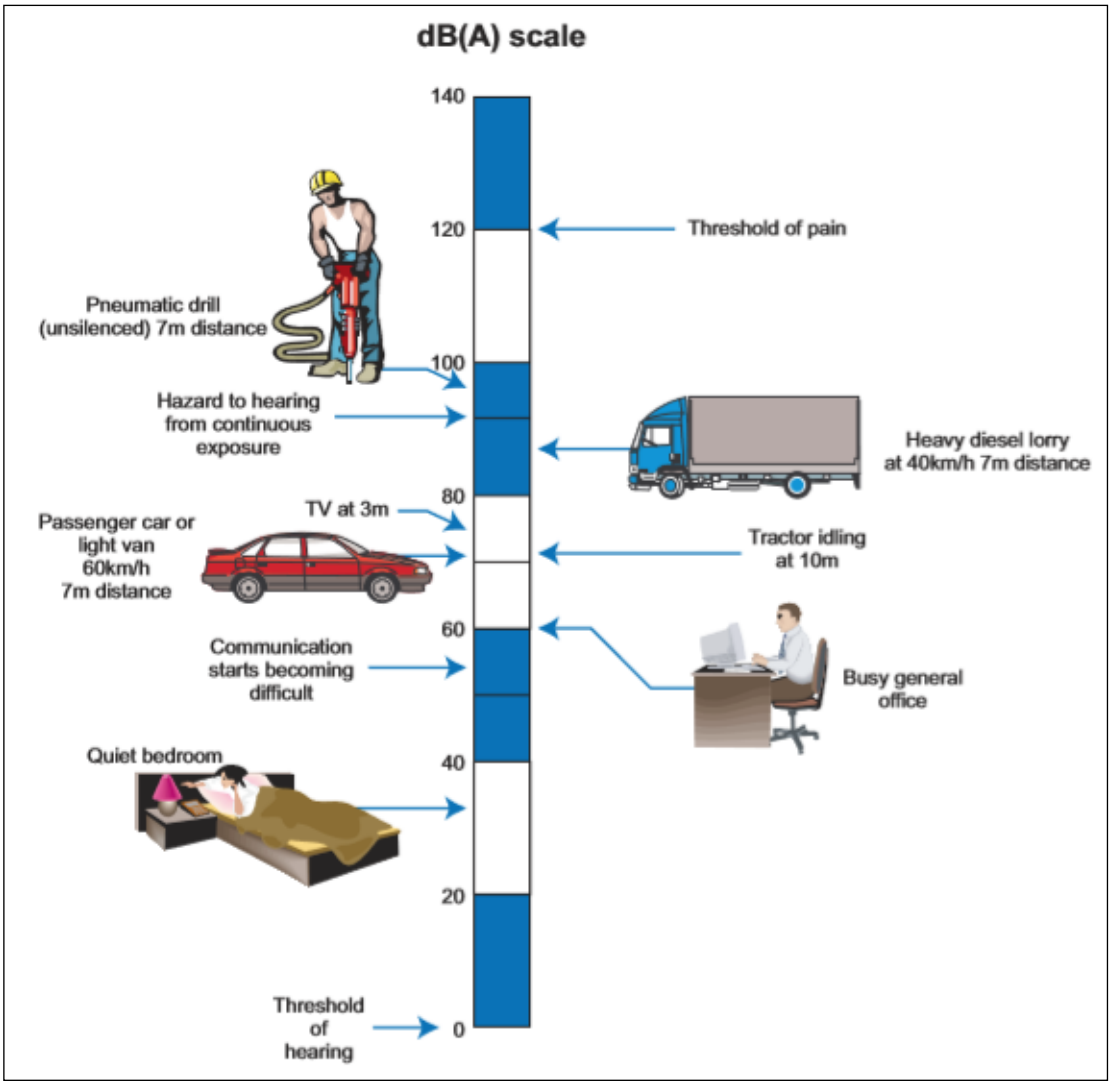


Figure 11-1 The level of typical common sounds on the dB(A) scale (NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004)

11.3 Assessment Methodology

The assessment of impacts has been undertaken with reference to the most appropriate guidance documents relating to noise and vibration for the past peat extraction activities and all ancillary works, which are set out within the relevant sections of this chapter.

In addition to the specific guidance documents outlined below, the Environmental Impact Assessment (EIA) guidelines listed in Chapter 1 Introduction were considered and consulted for the purposes of preparing this rEIAR chapter.

The methodology adopted for this noise impact assessment is summarised as follows:

- Review of appropriate guidance to identify appropriate noise and vibration criteria for the Peat Extraction Phase, Current Phase and Remedial Phases;
- Characterise the receiving environment through baseline noise surveys at various NSLs surrounding the Application Site;
- Undertake predictive calculations to assess the potential impacts associated with the Project phases and related activities at NSLs;
- Evaluate the potential noise and vibration impacts and effects; and,

- Describe the significance of the residual noise and vibration effects associated with the peat extraction activities and all ancillary works at the Application Site.

11.3.1 EPA Description of Effects

The significance of effects of peat extraction activities and all ancillary works shall be described in accordance with the EPA guidance document *2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*. Details of the methodology for describing the significant of the effects are provided in Chapter 1 – Introduction.

The effects associated with the peat extraction activities and all ancillary works are described with respect to the EPA guidance in the relevant sections of this chapter.

11.3.2 Guidance Documents and Assessment Criteria

The following sections review best practice guidance that are considered appropriate to developments such as peat extraction within the Application Site. Although peat extraction activity at the Application Site took place between the years 1948 to 2020, the approach here is to assess the impacts of activities at the Application Site from 1988 onwards, using the current appliable IPC Licence Reg No P0501-01 which was granted by the EPA in April 2000, when noise limits for the activities at the Application Site first came into place. The IPC Licence was amended on 27th September 2012, 18th June 2013 and 25th February 2014. If it can be shown that the peat extraction activities and all ancillary works meet the noise criteria defined in the IPC Licence, then it can be concluded that the Application Site operated and is operating without significant noise impact.

11.3.2.1 Noise

As discussed above in Section 11.3.2, the activities at the Application Site governed by the IPC Licence which imposes noise limits on the onsite activities.

As activity on site was, is and will be carried out in daytime and evening hours only (note, peat extraction may have occasionally gone on into the evening hours during the summer only when weather permitted), the relevant noise level limit is 55dB $L_{Aeq,30min}$ at NSLs. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the site for that period.

11.3.2.2 Vibration

Reference is made to BS 6472-1:2008 (BSI 2008) which provides the following Vibration Dose Value (VDV) ranges as in Table 11-1 which result in various probabilities of adverse comment (i.e. complaints) resulting from exposure to vibration within residential buildings. An adverse comment is an unfavourable human reaction or response.

Table 11-1 BS 6472 Table 10.5: VDV ($m/s^{1.75}$) above which various degree of adverse comment may be expected in residential buildings

Building Type	Low probability of adverse (1)	Adverse comment possible	Adverse comment probable (2)
Residential building – Day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building – Night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Note 1) Below these ranges adverse comment is not expected. Note 2) Above these ranges adverse comment is very likely.

11.3.3 Background Noise Assessment

Reference is made to the background noise survey undertaken at the Application Site as part of the proposed Ballivor Wind Farm development (ABP Ref. PA25M.316212) to determine baseline noise levels in the receiving environment. The relevant details are discussed in the following sections.

11.3.3.1 Choice of Measurement Locations

Noise monitoring at sensitive receptors was not undertaken during the Peat Extraction Phase. However, noise monitoring was undertaken as part of the proposed Ballivor Wind Farm planning application. The representative background noise levels taken at sensitive locations around the Application Site are used to ascertain typical background noise levels during the Peat Extraction Phase. Coordinates for the noise monitoring locations are detailed in Table 11-2 and illustrated in Figure 11-2.

Table 11-2 Measurement Location Coordinates

Location	Coordinates – Irish Transverse Mercator (ITM)	
	X (ITM)	Y (ITM)
A (H094)	663929	760400
B (H115)	666471	759713
C (H103)	664791	757635
D (H059)	662819	756051
E (H113)	664640	756125
G (H198)	666769	752349
H (H218)	659185	757155

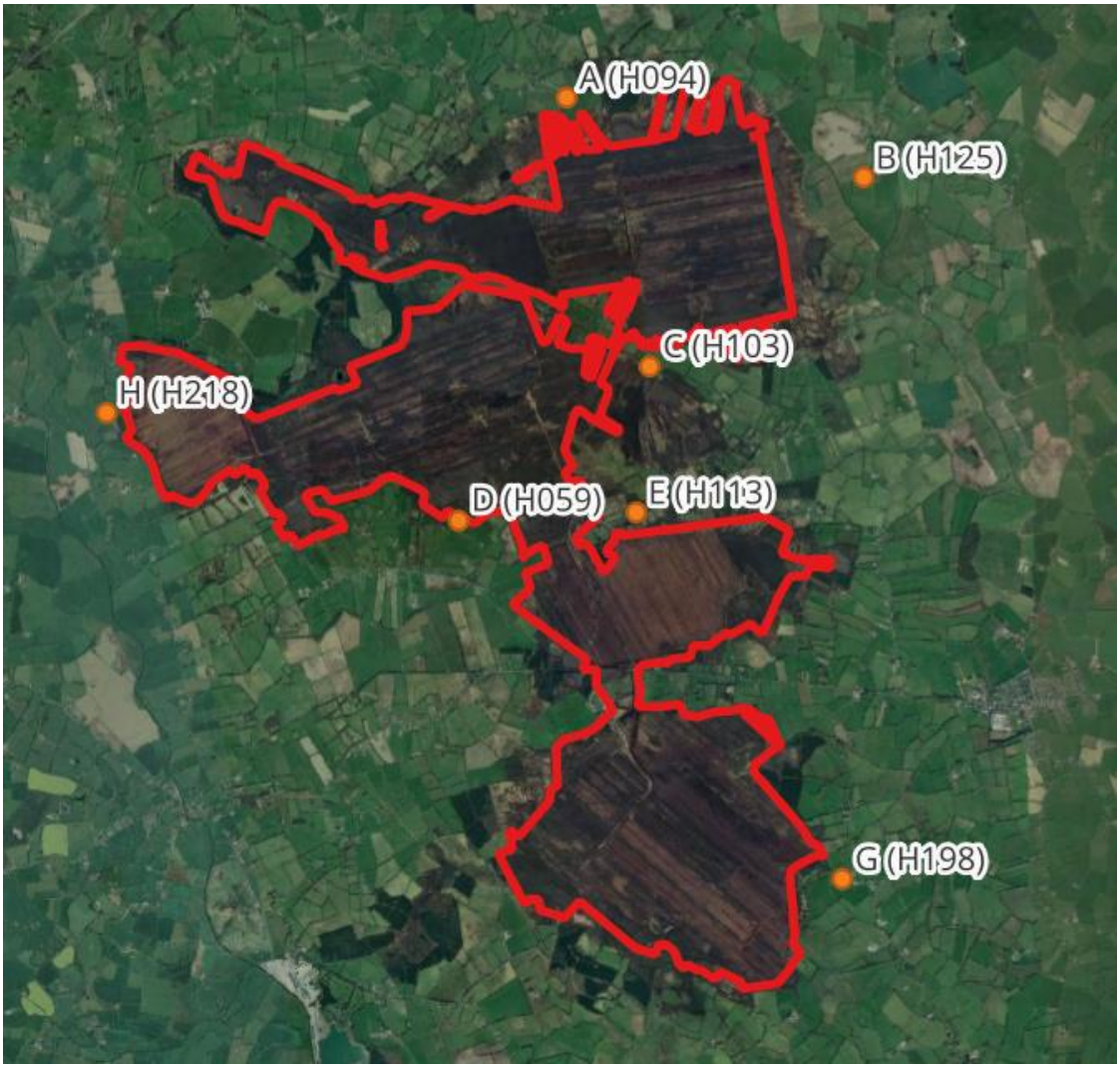


Figure 11-2 Indicative measurement locations (A, B, C, D, E, F and G).

Significant noise sources in this area were noted to be distant traffic movements, activity in and around the residences and wind generated noise from local foliage and other typical anthropogenic sources typically found in such rural settings. Flowing water was audible at some locations. The noise monitoring was undertaken during the Current Phase when peat stockpile removal was underway; therefore, the machinery listed in Section 11.5.2 was present and operating at the Application Site during the monitoring period.

11.3.3.2 Measurement Periods

Noise measurements were conducted at each of the monitoring locations over the periods outlined in Table 11-3.

Table 11-3 Measurement Periods

Location	Start Date	End Date
A (H094)	25 August 2020	27 October 2020
B (H115)	29 August 2020	28 October 2020
C (H103)	25 August 2020	23 October 2020

D (H059)	25 August 2020	28 October 2020
E (H113)	25 August 2020	26 October 2020
G (H198)	25 August 2020	18 October 2020
H (H218)	25 August 2020	22 October 2020

A variety of wind speed and weather conditions were encountered over the survey periods in question. As discussed below, the data collected during the survey in support of the proposed Ballivor Wind Farm planning application was filtered to remove windy periods for the Peat Extraction Phase, Current Phase and Remedial Phase noise impact assessment.

11.3.3.3 Personnel and Instrumentation

AWN Consulting installed and removed the noise monitors at all locations. Battery checks and meter calibrations were carried out part-way through the survey periods. Table 11-4 details the instrumentation used at the various monitoring locations.

Table 11-4 Instrumentation Details

Location	Equipment	Serial Number	Max. Calibration Drift (dB)
A (H094)	Rion NL-52	186671	0.2
B (H115)	Rion NL-52	186671	0.2
C (H103)	Rion NL-52	186670	0.1
D (H059)	Rion NL-52	575785	0.2
E (H113)	Rion NL-52	575802	0.1
G (H198)	Rion NL-52	164427	0.1
H (H218)	Rion NL-52	998409	0.2

Before and after the survey the measurement apparatus was check calibrated using a sound level calibrator where appropriate. Instruments were calibrated on each interim visit and any drift noted. Relevant calibration certificates are presented in Appendix 11-2.

Rainfall was monitored and logged using a Texas Instruments TR-525 console and a data logger that was installed on-site for the duration of the surveys. This allows for the identification of periods of rainfall, which allows for the removal of sample periods affected by rainfall from the noise monitoring data sets in line with best practice when calculating the prevailing background noise levels.

11.3.3.4 Procedure

Measurements were conducted at the seven locations over the survey periods outlined in Table 11-3. Data samples for all measurements (noise, rainfall and wind) were logged continuously at 10-minute interval periods for the duration of the survey. Daytime baseline levels were established by removing measured data when the wind speeds were typically above 5 m/s, and by also removing noise levels measured during wet conditions.

11.3.4 Noise Calculations

British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise is appropriate for open sites such as the Application Site. The standard contains a calculation method for noise propagation from machinery across different types of ground can take account of screening and the 'on-time' of different items, to calculate a $L_{Aeq,T}$ at a noise-sensitive location which can be compared to the adopted operational noise criterion.

11.4 Establishing the 1988 Baseline Conditions

By 1988, peat extraction activities and all ancillary works were well established at Lisclogher, Bracklin and Ballivor bogs and underway in the western portion of Carranstown bog. Drainage was fully inserted in all bogs with the exception of Lisclogher West, where drainage had been partially but not fully inserted by 1988. Railway infrastructure was laid on all bogs except Lisclogher West. As noise measurements are not available from the baseline year, 1988, the results of the recent noise survey undertaken to support the Ballivor Wind Farm planning application are presented here. Measured noise levels, filtered in accordance with the procedure in Section 11.1.1 are presented in Table 11-5.

Table 11-5 Measured Noise Levels

Location	Period	L_{Aeq}	L_{A90}
A	Day	62	28
	Evening	55	23
	Night	37	19
B	Day	51	33
	Evening	43	28
	Night	31	34
C	Day	43	29
	Evening	37	25
	Night	37	22
D	Day	43	29
	Evening	39	21
	Night	32	>20
E	Day	47	28
	Evening	37	22
	Night	34	>20
G	Day	54	30

Location	Period	L_{Aeq}	L_{A90}
	Evening	49	26
	Night	31	22
H	Day	65	49
	Evening	61	44
	Night	52	40

11.5 Project Description

For a detailed description of the Peat Extraction Phase, the Current Phase and Remedial Phase please refer to Chapter 4 Description of Development. The below outlines the noise emanating specific elements of the Peat Extraction Phase, the Current Phase, and the Remedial Phase.

11.5.1 Peat Extraction Phase (1988 - 2020)

As outlined above, by 1988 peat extraction was well established at Lisclogher, Bracklin and Ballivor bogs and underway in the western portion of Carranstown bog. Drainage was fully inserted in all bogs with the exception of Lisclogher West, where drainage had been partially but not fully inserted by 1988. By 1988, railway infrastructure was laid on all bogs except Lisclogher West. From 2003 onwards, peat extraction was limited to Ballivor, Carranstown and Bracklin West bogs, with third-party sod extraction taking place in Lisclogher bog (refer to Chapter 4 for further detail). The annual breakdown of primary activities associated with the Peat Extraction Phase are outlined in Table 11-6.

Table 11-6 Annual Peat Extraction Activities 1988-2020

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

The types of noise generating peat extraction machines used during the Peat Extraction Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEIAR and are summarised below.

- Drainage and Bog Preparation Machinery such as Dragline/Shovel Excavator
- Peat Extraction Machinery such as:
  - Tractors (H.D, LHT, and Ridger)
  - Windrow Machine
  - Sod Moss Peat Collector
  - Milled Peat Harvester

- Dump Truck
- Wheeled Loader Lorry;
- Track Excavator;
- Dozer;
- Dewatering Pumps;
- Rail Lifter;
- Locomotive and Wagons;
- Motor Cycles; and,
- Service Vehicles.

In addition to these machines, delivery trucks exported peat which had been extracted at the Application Site and transported to Ballivor Works via internal rail, and from there to its end destination by truck, with unladen trucks returning to Ballivor Works daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

From 2000 onwards, the Application Site has operated under IPC Licence P0501-01. Condition 8 of the IPC Licence includes the following limits on noise levels:

Condition 8:

8.1 Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($L_{eq,30min}$) subject to Condition 3 of this licence:

Day-time: 55 dB(A)

Night-time: 45 dB(A).

8.2 There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

Condition 3:

3.3 Noise

3.3.1 Noise from the activity shall not give rise to sound pressure levels (Leq,T) measured at noise sensitive locations which exceed the limit value(s) by more than 2 dB(A).

As activity on the Application Site has been carried out in daytime hours only, the relevant noise level limit is 55dB $L_{Aeq,30min}$ at noise-sensitive locations. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the Application Site for that period.

Since the implementation of the above, there have been no breaches of noise limits by the onsite activities or noise complaints from noise sensitive locations in the vicinity of the Application Site. There are no records of noise complaints ever received regarding the Application Site for the period 1988 to the implementation of the above limits in 2000.

11.5.2 Current Phase (2020 – Present)

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on site is much reduced when compared to the Peat Extraction Phase. On site activities are limited to removal of the existing peat stockpiles from Bracklin and Ballivor Bogs, which was completed by the end of 2023. The types of noise generating machines during the Current Phase are listed below in Table 10-3. In addition to these machines, delivery trucks exported peat which had been extracted at

the Application Site and transported to Ballivor Works via internal rail, from Ballivor Works to its end destination, with unladen trucks returning to Ballivor Works daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

However, due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, these movements are at a much lesser volume than during the Peat Extraction Phase. The onsite machinery which are used during the Current Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEIAR, and are summarised listed below:

- Wheeled Loader Lorry;
- Track Excavator;
- Locomotive and Wagons;
- Dump Truck; and,
- Tractors.

Section 11.6.3 presents the noise assessment for the Current Phase. Based on the predicted noise levels, the Application Site has been in full compliance with the noise limits set out in the IPC Licence during the Current Phase.

11.5.3 Remedial Phase

The Remedial Phase refers to managed rehabilitation of the bogs in accordance with the requirements of Condition 10 of the IPC Licence. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The rehabilitation of the Application Site will support biodiversity e.g., plants, insects, bird and mammals, and the formation of wetland habitats. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity, habitat regeneration and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

It is a requirement of 'Condition 10 Cutaway Bog Rehabilitation' of the IPC Licence that Bord na Móna, following decommissioning of use of all or part of their bogs, prepares (to the satisfaction of the EPA) and implements a Cutaway Decommissioning and Bog Rehabilitation Plan. Ecologists and site managers will visit the Application Site regularly for monitoring purposes. Noise generating machinery will be limited to occasional tractors or excavators to facilitate in the drain blocking process across the Application Site. These activities will be limited to the first 2 years of the phase. In addition, ecologists and site managers will travel to and from the site daily in light goods vehicles (LGVs) to oversee these activities. All peat stockpiles have been removed from the Application Site as of 2023, and as such no Heavy Goods Vehicles (HGVs) movements associated with the removal of extracted peat from Ballivor Works are anticipated to be required during the Remedial Phase. The onsite machinery to be used during year 1 and 2 of the Remedial Phase are listed below:

- Tracked Excavator, and
- Tractor.

From year 3 onwards, the only vehicles on site will be infrequent site visits (1-2 per month) by ecologists and site managers in lights good vehicles (LGVs) to monitor the progress of the rehabilitation plans.

Again, during this phase, despite the significant reduction in noise generating machinery the Applicant is committed to complying with all conditions, including noise, set out in IPC Licence, where applicable.

11.6 Likely Significant Effects and Associated Mitigation Measures

11.6.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and

Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

11.6.2 Identification and Description of Potential Impacts

11.6.2.1 Peat Extraction Phase (July 1988- June 2020)

11.6.2.1.1 *Peat extraction activities and all ancillary works*

A variety of items of machinery were in use for the purposes of peat extraction activities and all ancillary works. There were vehicular movements to and from the Application Site that made use of existing roads. Potential noise impacts are discussed in the following sections. It should be noted that peat extraction activities were seasonal, with peat extraction occurring during summer months when weather permitted. Potential noise impacts from machinery and equipment would have been experienced intermittingly during the active periods due to the continuous movement of machinery around the Application Site, i.e., no machinery operated continuously in the one location near sensitive receptors.

The approach below predicts noise levels at various distances to determine if significant effects are likely to have occurred.

As discussed in Section 11.3.4 the calculation methods in BS5228 are suitable for the calculation of noise levels at noise-sensitive locations near open sites such as the Application Site. The assessment begins with a set of machinery items that are considered typical for the activity of peat extraction which are listed below in Table 11-7.

Table 11-7 Representative Peat Extraction Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Dump Truck (C4.2)	78
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dewatering Pumps (D7.70)	80
Tractors (H.D, LHT, Ridger)	81
Rail Lifter	81
Locomotive and Wagons	81
Dragline/Shovel Excavator	81
Windrow Machine	81
Sod Moss Peat Collector	81
Milled Peat Harvester	81
Motor Cycles	81
Service Vehicles	81

Table 11-8 presents the operational noise levels for the Peat Extraction Phase at various distances from the activity. Again, due to the nature of the bog landscape it is assumed that the ground between the peat extraction activity and the noise-sensitive location is 'soft'; i.e., no acoustic screening was in place. The 'on-time' is assumed to by 80%, i.e., the machinery was operating for 80% of the working day. As a conservative measure, the calculations assume that all items of machinery listed in the table above operated at the same time at the stated distance from a noise-sensitive location, though this is unlikely to have been the case at all times.

Table 11-8 Typical Noise Emission Levels due to Peat Extraction

Phase	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	200m set back	250m set back	300m set back	350m set back
Peat Extraction	55	53	51	49

At distances of 200 m and beyond, the levels of noise are below the operational noise criterion of 55 dB $L_{Aeq,T}$ adopted in Section 11.3.4. Figure 11-3 shows the noise-sensitive locations with a coloured buffer of 200m around each one. Figure 11-4 shows highlighted yellow areas where the parts of the Application Site lie within 200m of a noise-sensitive location.

Any vibration generated by the machinery listed in Table 11-7 would be imperceptible at sensitive receptors at the distances listed above.



Figure 11-3 Noise-sensitive Locations with 200m buffers.



Figure 11-4 Areas, shown in yellow, where bog is within 200m of a noise-sensitive locations.

The diagrams show that only in a very limited number of locations at the Application Site, the peat extraction activity and all ancillary works had the potential to be within 200m of a noise-sensitive location. Beyond 200m, noise levels are within the criteria.

Vibration

During the Peat Extraction Phase, there were no significant vibration-generating sources operating on the Application Site. The vibration effects are neutral, imperceptible and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at the nearest noise sensitive locations associated with the Peat Extraction Phase are as described below. As the noise levels are below the criterion, the effect is considered not significant.

Quality	*Significance*	*Duration*
Negative	Not Significant	Long-term but limited to daytime and evenings and was seasonally dependant

11.6.2.1.2 *Additional Traffic on Public Roads*

In terms of the additional traffic on local roads that was generated as a result of peat extraction activities and all ancillary works, the following comment is presented: Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25%[1]. As demonstrated in Chapter 14 Material Assets, the volume of traffic generated by the Application Site for the 1988 to June 2020 period is estimated at 185,760 HGVs, leaving and returning to the Application Site over the 33-year period. This equates to an average of 22 HGV movements per day heading to different locations over a 252-day work-year. Personnel vehicles are estimated at 1,354,500 movements over the 33-year period which equates to 163 vehicles per day. Please see Chapter 14 Material Assets for details. It is considered that this additional traffic introduced onto the local road network did not result in a significant noise impact. The resultant noise impact was negative, not-significant and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at noise sensitive locations associated with the additional traffic generated during the Peat Extraction Phase are as described below.

Quality	*Significance*	*Duration*
Negative	Not-significant	Long-term

11.6.2.1.3 *Control Measures*

Prior to 2000, control measures pertaining to noise comprised of machinery maintenance:

1. *All peat harvesting machinery listed above in Section 4.2.2.3 were stored at the Ballivor Works at the end of the workday.*
2. *All machinery were regularly inspected, serviced.*
3. *Railway tracks and railway locomotives underwent continuous inspection and maintenance*

[1] *UK Design Manual for Roads and Bridges (DMRB, Volume 11, Section 3, Part 7)*

A discussed in Section 11.3.2, since April 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

Day-time: 55 dB(A)

Night-time: 45 dB(A).

Since 2000 there have been no breaches of noise limits by the onsite activities or noise complaints from noise sensitive locations in the vicinity of the site.

The following comments are taken from the Inspectors report for the licence application:[2]

> *No noise complaints have been received by the Agency with respect to operations associated with this application. The most dominant noise source associated with peat harvesting is rail movement while noise emissions also arise from the milling/harvesting operations. A baseline noise survey was conducted at two of the Bord na Móna Groups (Allen & Boora) and these were stated as being representative of noise emissions from all of the sites. The studies concluded that noise levels resulting from activities at the sites are unlikely to have any significant impact on the local environment. This was confirmed by noise monitoring undertaken during the peat harvesting season. The noise condition in the proposed determination will limit noise emissions from activities at the sites to daytime 55 L_{eq} dBA and night-time 45 L_{eq} dBA at noise sensitive locations.*

11.6.2.2 Current Phase (June 2020 – Present Day)

11.6.2.2.1 *Peat Removal and Rehabilitation*

During the Current Phase, the noise generating activities at the Application Site are much reduced with respect to the Peat Extraction Phase. The activity has been limited to removal of the former peat stockpiles from Bracklin and Ballivor bogs; the stockpiled peat was transported to Ballivor Works via internal rail, where it was taken via tipper trucks for loading onto lorries and transported from Ballivor Works to its end destination. Other elements of the Current Phase are the environmental and ecological monitoring and some rehabilitation works, neither of which generate significant noise.

Similar to the Peat Extraction Phase, the approach taken predicts noise levels at various distances, to evaluate as to whether any significant effect is occurring or likely to have occurred. The machinery involved in peat removal are listed in Table 11-9.

Table 11-9 Representative Peat Removal and Rehabilitation Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dump Truck (C4.2)	78

[2] https://epawebapp.epa.ie/licences/lic_eDMS/090151b280043529.pdf, *From Licence application Reg 501, page, 4, 1999*

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Rehabilitation: Plough	81

Table 11-10. presents the noise levels for the Current Phase at various distances from the activity. Again, it is assumed that the ground between the Current Phase activity of peat removal and the noise-sensitive location is 'soft'. No acoustic screening is in place.

Table 11-10 Typical Noise Emission Levels due to Peat Removal

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	150	200	250	300
Peat Removal and Rehabilitation Machinery	53	49	47	45

As there are fewer noise sources in the Current Phase than in the Peat Extraction Phase, less noise is generated and the distances at which the criteria would be exceeded is less: at distances of 150 m and beyond, the levels of noise are below the operational noise criterion of 55 dB $L_{Aeq,T}$. Similar to the Peat Extraction Phase, the number of noise-sensitive locations within 150m is limited.

Vibration

During the Current Phase, there are no significant vibration-generating sources operating at the Application Site. The vibration effects are neutral, imperceptible and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects associated with the current phase at the nearest noise sensitive are described below.

Quality	*Significance*	*Duration*
Negative	Not Significant	Short-term

11.6.2.2.2 *Control Measures*

The assessment in Section 11.6.2.2.1 above has found that there are no significant noise impacts. However, as stated in Section 11.6.2.1.3, since April 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

- *Day-time: 55 dB(A)*
- *Night-time: 45 dB(A).*

11.6.2.3 Remedial Phase

11.6.2.3.1 *Rehabilitation Works*

The main activity associated with the Remedial Phase comprises the blocking of drains across all bogs and involves a limited amount of machinery, as listed in Table 11-11. The blocking is expected to occur in year 1 and 2. During this phase, ecologists and site managers will oversee the works and therefore, personnel vehicles will travel to and from the site daily. From year 3 onwards, just monthly site visits by ecologists and site managers will occur to monitor the success of the rehabilitation.

Table 11-11 Machinery for the Remedial Phase and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Track Excavator (C2 22)	72
Tractor (n/a)	81

Table 11-12 presents the operational noise levels for the Remedial Phase at various distances from the activity.

Table 11-12 Representative Noise Emission Levels due to Remedial Phase year 1 and 2 only

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	80	100	125	150
Rehabilitation Machinery	55	53	51	49

Similarly, as the number of noise-generating items required is less than those associated with the Peat Extraction Phase, the distances at which the criteria would be exceeded are further reduced; at distances of 80 m and beyond, the levels of noise are all below the operational noise criterion of 55 dB $L_{Aeq,T}$. Similar to the Current Phase, the number of noise-sensitive locations within 80m is limited.

Vibration

During the Remedial Phase, there will be no significant vibration-generating sources operating on the Application Site. The vibration effects are neutral, imperceptible and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at the nearest noise sensitive associated with the Remedial Phase are described below.

Quality	*Significance*	*Duration*
Neutral	Imperceptible	Long-term

11.6.2.3.2 *Mitigation Measures*

The Applicant will continue to comply with the conditions relating to noise set out in the IPC Licence as applicable.

11.6.3 Residual Effects

11.6.3.1 Peat Extraction Phase (July 1988- June 2020)

The Noise Impact Assessment has concluded that noise emissions and vibration generated during the Peat Extraction Phase were not significant. The noise emissions associated with the current on-site activities and the future rehabilitation works are considered less than the past peat extraction activities and all ancillary works and therefore potential of residual effects associated with the Peat Extraction Phase are considered long term negative but not significant. In respect of noise and vibration from additional traffic on public roads due to activity on site, the effects at the nearest noise sensitive were also long term negative but not significant.

11.6.3.2 Current Phase (June 2020 – Present Day)

The potential effects at the nearest NSLs associated with the Current Phase activities are described as negative, not significant and short-term.

11.6.3.3 Remedial Phase

The potential effects at the nearest NSLs associated with the remedial measures phase activities are described as neutral, imperceptible, and long-term.

11.6.4 Significance of Effects

11.6.4.1 Peat Extraction Phase (July 1988- June 2020)

The effects at the nearest NSLs associated with the Peat Extraction Phase are described as not significant.

11.6.4.2 Current Phase (June 2020 – Present Day)

The effects at the nearest NSLs associated with the Current Phase are described as not significant.

11.6.4.3 Remedial Phase

The effects at the nearest NSLs associated with the Remedial Phase are described as imperceptible.

11.6.5 Cumulative and In-Combination Effects

11.6.5.1 Peat Extraction Phase (July 1988- June 2020)

Chapter 4 describes in detail the peat extraction activity from 1948 until 1988. There is no temporal overlap between peat extraction during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural

activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Peat Extraction Phase, there is no potential for cumulative effects with typical rural background noise-generating activities.

11.6.5.2 Current Phase (June 2020 – Present Day)

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Current Phase, there is no potential for cumulative effects with typical rural background noise-generating activities.

11.6.5.3 Remedial Phase and Overall Cumulative Effect

Chapter 4 describes in detail the peat extraction activity from 1948 until 1988. There is no temporal overlap between peat extraction during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Project, there is no potential for cumulative effects with typical rural background noise-generating activities.

The proposed Ballivor Wind Farm (ABP Ref. PA25M.316212) is subject to a separate EIAR and contains an assessment of noise from the construction, operation and decommissioning phase of wind farm in accordance with best practice. As wind turbine noise varies with wind speed at any time, a specific noise assessment methodology is used which takes account of the variability of noise levels over the operating wind speed range. Wind turbine noise at noise-sensitive locations is described in terms of the L_{A90}, parameter which is the level which is exceeded for 90% of the measurement period. It will therefore exclude the effects of brief, intermittent events and is used to estimate a background level.

Noise from the machinery associated with the Remedial Phase (years 1 and 2) is not dependent on the wind speed and is therefore assessed differently, i.e. calculating the external noise level at the façade of noise-sensitive locations. These noise levels are then compared to criteria as discussed in Section **Error! Reference source not found.**, in terms of the L_{Aeq} parameter, which is the equivalent continuous sound level. Each assessment method is robust and appropriate to the noise source in each case.

If the proposed Ballivor Wind Farm is consented, it is extremely unlikely the drain blocking activities of the Remedial Phase will occur concurrently to the operation of the wind farm. The drain blocking will be done either in advance of any wind farm construction or post construction. However, in the unlikely event they occurred at the same time, the noise criteria for the Remedial Phase (day-time) activities are 55 dB L_{Aeq} (defined in Section 11.3.2). Therefore, based on the below limits for the wind farm, it is considered that there is no significant potential for cumulative effects should the two events run concurrently.

The proposed operational limits in $L_{A90,10min}$ for Ballivor Wind Farm will be, at the facades of noise-sensitive locations:

- 40 dB $L_{A90,10min}$ for quiet daytime environments of less than 30 dB $L_{A90,10min}$;
- 45 dB $L_{A90,10min}$ for daytime environments greater than 30 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher), and;
- 43 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher) for night-time periods.

The consented Bracklyn Wind Farm (ABP Ref. PA25M.311565) development comprising 9 turbines and ancillary infrastructure is located immediately adjacent to the Application Site boundary. The Bracklyn Wind Farm EIAR has demonstrated that there are no significant cumulative effects with the proposed Ballivor Wind Farm. As such, there is no potential for cumulative effects with the Ballivor Wind Farm and Remedial Phase activities.

11.7 Conclusion

This chapter of the rEIAR has assessed the potential for any likely significant effects of noise and vibration due to past activities at Ballivor Bog. Noise and vibration impacts have been identified, described and then assessed as 'not significant' for the Peat Extraction Phase and the Current Phase, and as 'imperceptible' for the Remedial Phase.

In respect of vibration none of the three phases included or will include any significant vibration-generating sources operating on the Application Site.

The assessment of potential cumulative effects of the Remedial Measures phase and the proposed Ballivor wind farm, along with the consented Bracklyn wind farm, has concluded that is no potential for cumulative effects with the wind energy developments.

12. LANDSCAPE AND VISUAL

12.1 Introduction

This chapter of the rEIAR addresses the landscape and visual effects of the peat extraction activities and all ancillary works that took place at the Application Site which is the subject of this Substitute Consent Application submitted to An Bord Pleanála (hereafter referred to as 'the Board' or 'ABP'), in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended).

As reported in Chapter 4, the assessments in this rEIAR address the environmental impacts of peat extraction activities and all ancillary works occurring at the Application Site. The assessments in this chapter will determine the landscape and visual effects that occurred (or are likely to occur) during three differing timeframes termed 'phases' (as described in Chapter 4):

- **Peat Extraction Phase:** The significance of landscape and visual effects that occurred at the Application Site between July 1988 and June 2020.
- **Current Phase:** The significance of landscape and visual effects that occurred at the Application Site since the termination of peat extraction activities and all ancillary works in June 2020 to present day.
- **Remedial Phase:** The significance of landscape and visual effects that are likely to occur during future plans to restore the Application Site.

The emphasis in this chapter is on the (likely) significant direct and indirect landscape and visual effects during each of the Project phases reported above, as well as the potential for cumulative landscape and visual effects. This chapter includes the following:

- **Introduction** – Includes a description of the Application Site, its location and essential aspects of the peat extraction activities and all ancillary works during various Project phases requiring the most consideration from a landscape and visual assessment (LVIA) perspective.
- **Methodology and Assessment Criteria** – An outline of the methodology and guidance used to conduct the LVIA.
- **Landscape Baseline and Landscape Evolution** - Establishment of the conditions and character of the landscape at the Application Site and its wider landscape setting in 1988 and throughout both the Peat Extraction Phase and Current Phase. This includes a review of the landscape policy context and landscape designations pertinent to the Application Site from 1988 to present day.
- **Visibility Appraisal** – An appraisal of likely visibility of the Application Site from prominent visual receptors in proximity to the Application Site from sensitive visual receptors in the wider landscape.
- **Cumulative Baseline** – Identification and description of other sites of peat extraction in the wider landscape where the cumulative or in combination landscape and visual effects may potentially exist.
- **Landscape and Visual Effects** - A determination of the significance of landscape and visual effects during the three differing phases (Peat Extraction Phase; Current Phase; Remedial Phase), including an assessment of likely cumulative and in-combination effects. Assessment of effects is informed by site visits, review of historic satellite imagery and photography.

12.1.1 Statement of Authority

This chapter was written by Jack Workman. Jack Workman MSc, TMLI, is a Technician Member with the British Landscape Institute (TMLI). Jack is the Landscape & Visual Team manager at MKO, he is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist. Since joining MKO, Jack has conducted and project managed all aspects of LVIA for a broad range of commercial infrastructure developments including wind and solar energy projects, grid infrastructure, extraction industry and Strategic Housing Developments. Jack holds an MSc. in Coastal and Marine Environments and a BSc. in Psychology, he is a member of the Landscape Research Group, as well as holding a membership with the Chartered Institute of Water and Environmental Management.

This chapter was reviewed by Michael Watson. Michael is Project Director and head of the Environmental Team at MKO, an Irish planning and environmental consultancy with wind energy a company specialism. Michael has extensive expertise conducting LVIAs for wind farm developments and 20 years' professional consultancy experience as a project director, project manager and lead coordinator of environmental impact assessments for wind energy and other large-scale infrastructure projects.

12.1.2 Description of the Application Site & Activities Occurring During the Various Phases

The Application Site comprises five bogs located at the Westmeath-Meath County border. The bogs include: Ballivor, Carranstown, Bracklin, Lisclogher and Lisclogher West, with the total Application Site area comprising 2,421 hectares (ha). The site is located 2.5 km south-southeast of Delvin, 3.7 km east of Raharney and 2.2 km west of Ballivor Village. The Application Site measures approximately 9.27 km in length from north to south, and approximately 7.0 kilometres from east to west, at its widest point. Grid Reference co-ordinates for the approximate site centre are E263560, N257213. Under the Water Framework Directive (WFD), the Application Site is located within the Boyne_SC_040 and Boyne_SC_050 sub catchments and the Boyne (Catchment ID 07).

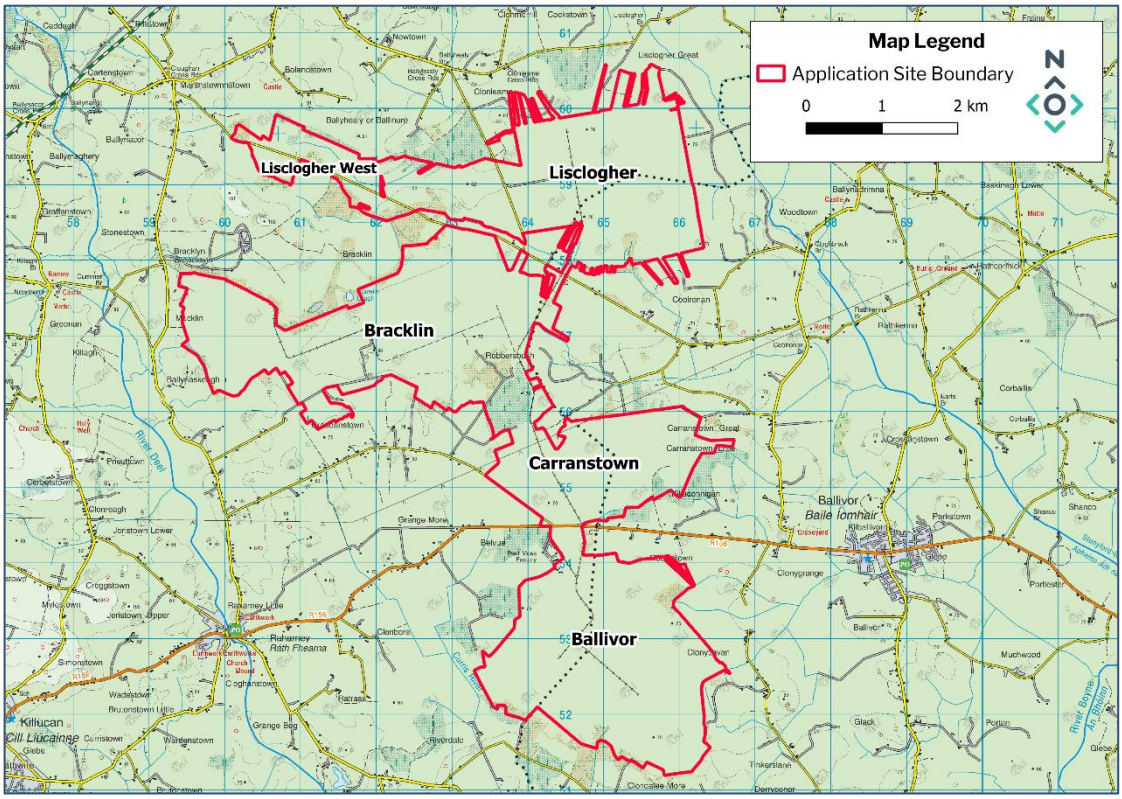


Figure 12-1 Location of the Application Site

The Application Site is accessed via the R156 Regional Road, which bisects the Application Site. The main site access points include a northern and southern entrance off the R156 Regional Road into Carranstown Bog and Ballivor Bog, respectively. Access to the remaining bogs is possible through Carranstown Bog and via local roads off the N52, N51 and N4 such as the L4106, L4101.

The following sections (Section 12.1.2.2, Section 12.1.2.4, Section 12.1.2.5) give an overview of the activities occurring at the Application Site throughout the various phases under assessment in this chapter. A comprehensive description of these phases and historic activities are reported in Chapter 4 of the EIAR.

12.1.2.1 The Baseline Assessment Year (1988)

The Peat Extraction Phase includes all peat extraction activities and all ancillary works occurring at the Application Site between 1988 and 2020. Chapter 4 provides a timeline of peat extraction activities and all ancillary works throughout the Peat Extraction Phase. The baseline conditions of the landscape of the Application Site in 1988 are illustrated in Figure 12-2, which shows the baseline status and extent of peat extraction activities and all ancillary works at differing areas of the Application Site in 1988. Figure 12-2 shows areas 'Subject to Peat Extraction' (represented as pink hatching on the map), which were areas actively subject to peat extraction in 1988. Areas that had drainage installed but which weren't subject to peat extraction in 1988 area mapped as 'Drained - Not Subject to Peat Extraction' (represented as pink cross hatching on the map), and areas 'Neither Drained nor Subject to Peat Extraction' (represented with orange hatching on the map).

As illustrated by Figure 12-2, peat extraction activity was occurring in:

- Ballivor Bog.
- Lisclogher Bog,
- the western extent of Carranstown Bog.
- A large proportion of Bracklin Bog and the southern extent of Bracklin Bog.

As indicated by Figure 12-2, a large proportion of Carranstown Bog to the east and the north-western extent of Bracklin Bog had been drained in 1988 but were Not Subject to Peat Extraction. Peripheral boundary areas of Ballivor Bog (southerly perimeter), Lisclogher Bog (northern and southern perimeter) and Bracklin Bog (northern and southern perimeter) were drained but Not Subject to Peat Extraction in 1988. Drainage was installed in Lisclogher West Bog between 1973 and 1995. However, Lisclogher West Bog, the bog was never subject to industrial peat extraction.

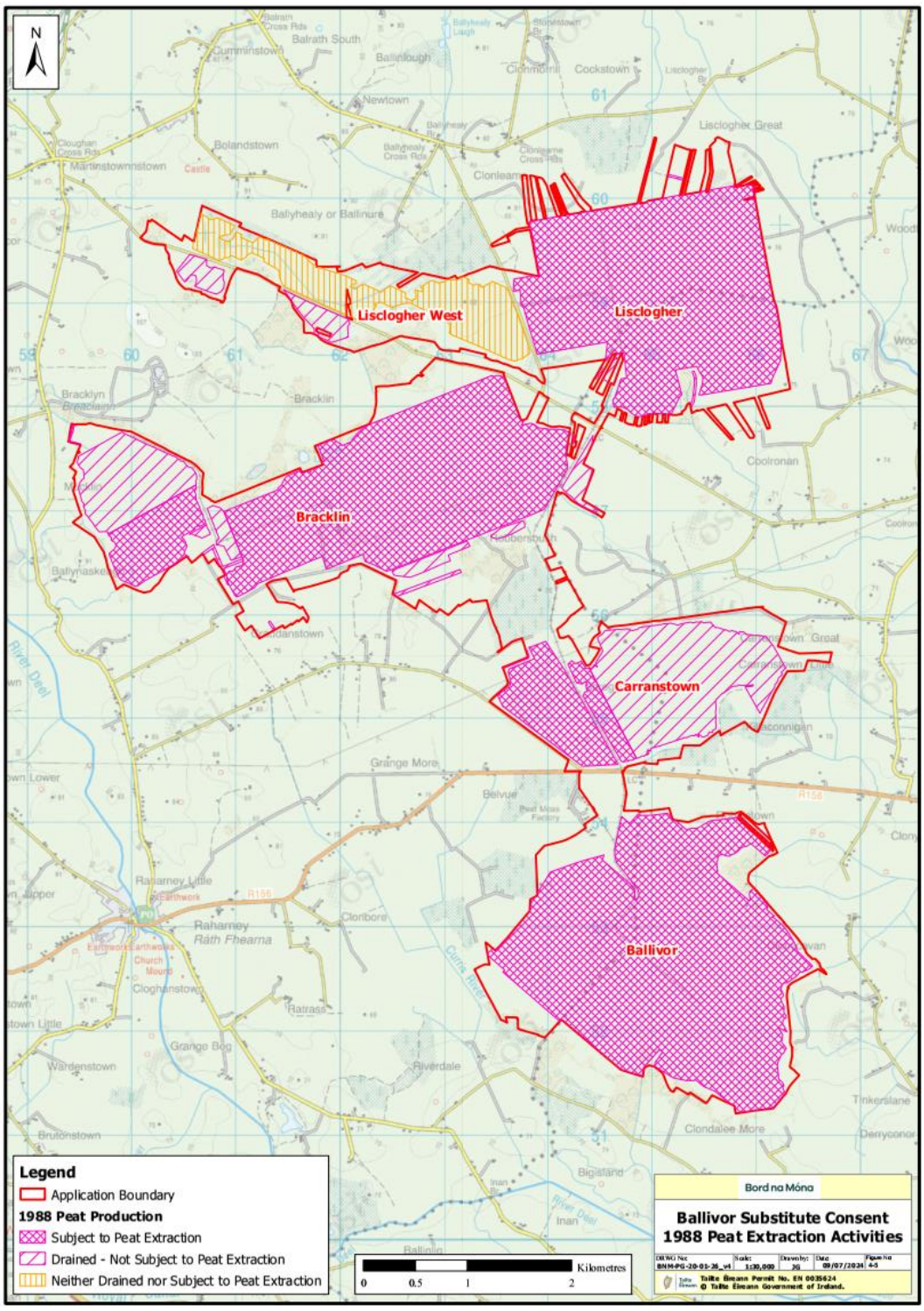


Figure 12-2 Ballivor Substitute Consent Peat Extraction Activities 1988 (Source - Bord na Móna, 2024)

12.1.2.2 Peat Extraction Phase (July 1988-June 2020)

Ballivor Bog

As shown below in **Error! Reference source not found.** below, most of Ballivor Bog was subject to Peat E xtraction in 1988 and it would have been a landscape of cut-over peatland. A large area to the south-west and a small section to the north of Ballivor Bog was Drained – Not Subject to Peat Extraction. By

2020, only a linear tract in the centre of Ballivor Bog and a tract along the western boundary of the bog were subject to peat extraction until all peat extraction activity ceased.

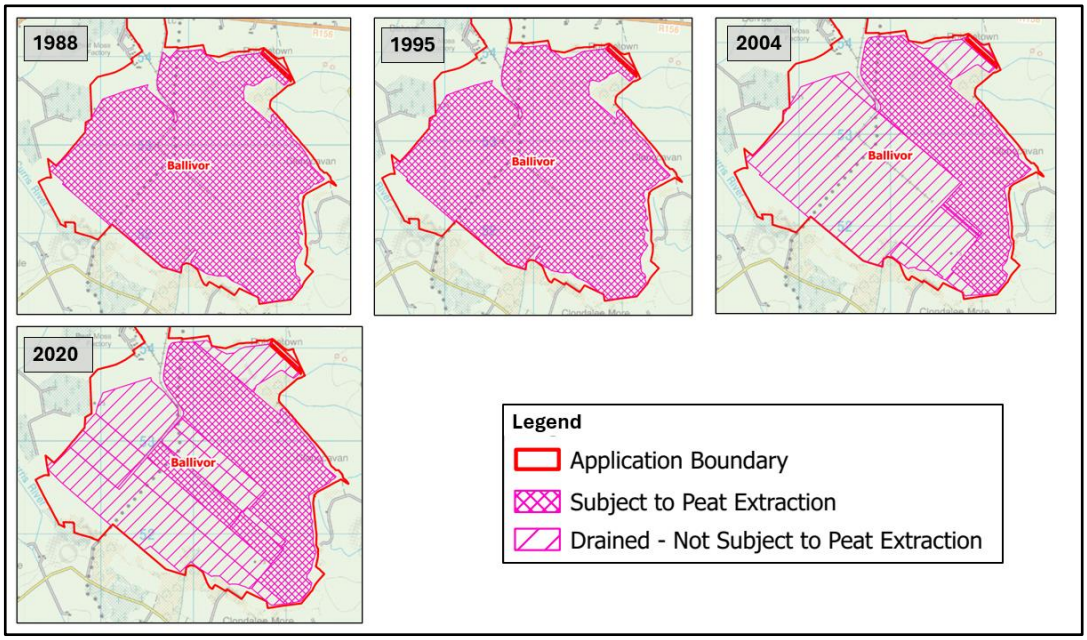


Figure 12-3 Evolution of Peat Extraction Activities at Ballivor Bog during the 'Peat Extraction Phase' (Figure produced from extracts of Peat Extraction Activities maps provided by Bord na Móna, 2024)

Carranstown Bog

Figure 12-4 (below) shows the change in the peat extraction activities at Carranstown Bog between 1988 and 2020. Several areas in the eastern portion of Carranstown Bog transitioned from 'Drained - Not Subject to Peat Extraction' to 'Subject to Peat Extraction' areas between 1988 and 2004. Between 1998 and 2004, peat extraction occurred in some areas in the centre of Carranstown Bog of previously drained bog, which was not subject to peat extraction, and some 'Subject to Peat Extraction' areas became 'Drained – Not Subject to Peat Extraction', particularly to the west of the bog. Most of the central area of Carranstown Bog was Subject to Peat Extraction between 2004 and 2020.

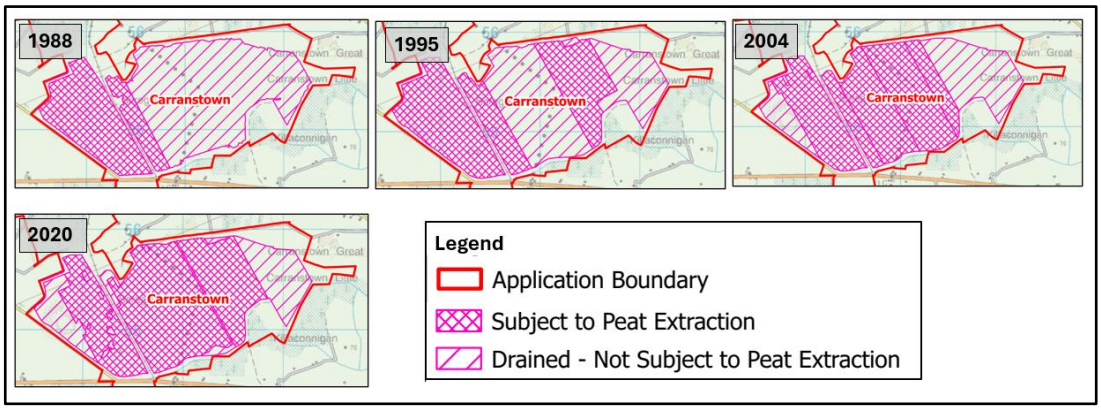


Figure 12-4 Evolution of Peat Extraction Activities at Carranstown Bog during the 'Peat Extraction Phase' (Figure produced from extracts of Peat Extraction Activities maps provided by Bord na Móna, 2024)

Bracklin Bog

As shown in Figure 12-5 below, the north-western portion of Bracklin Bog transitioned to a 'Subject to Peat Extraction' area from a 'Drained – Not Subject to Peat Extraction' area between 1988 and 1995. The entire western extent of Bracklin Bog was subject to peat extraction from 1995 until June 2020.

Between 1995 and 2020 the central and eastern portions of Bracklin Bog became Drained – Not Subject to Peat Extraction.

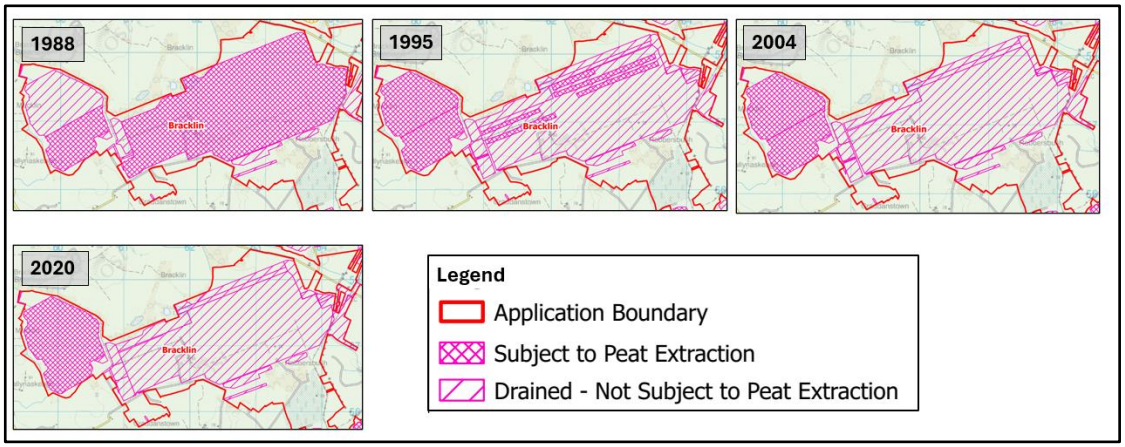


Figure 12-5 Evolution of Peat Extraction Activities at Bracklin Bog during the 'Peat Extraction Phase' (Figure produced from extracts of Peat Extraction Activities maps provided by Bord na Móna, 2024)

Lisclogher Bog

As shown in **Error! Reference source not found.** below, most of Lisclogher Bog was Subject to Peat Extraction during the 1988 baseline. From 2004, most of the bog was Drained – Not Subject to Peat Extraction through to 2020, except for some sections to the north of the bog which remained Subject to Peat Extraction in 2004.

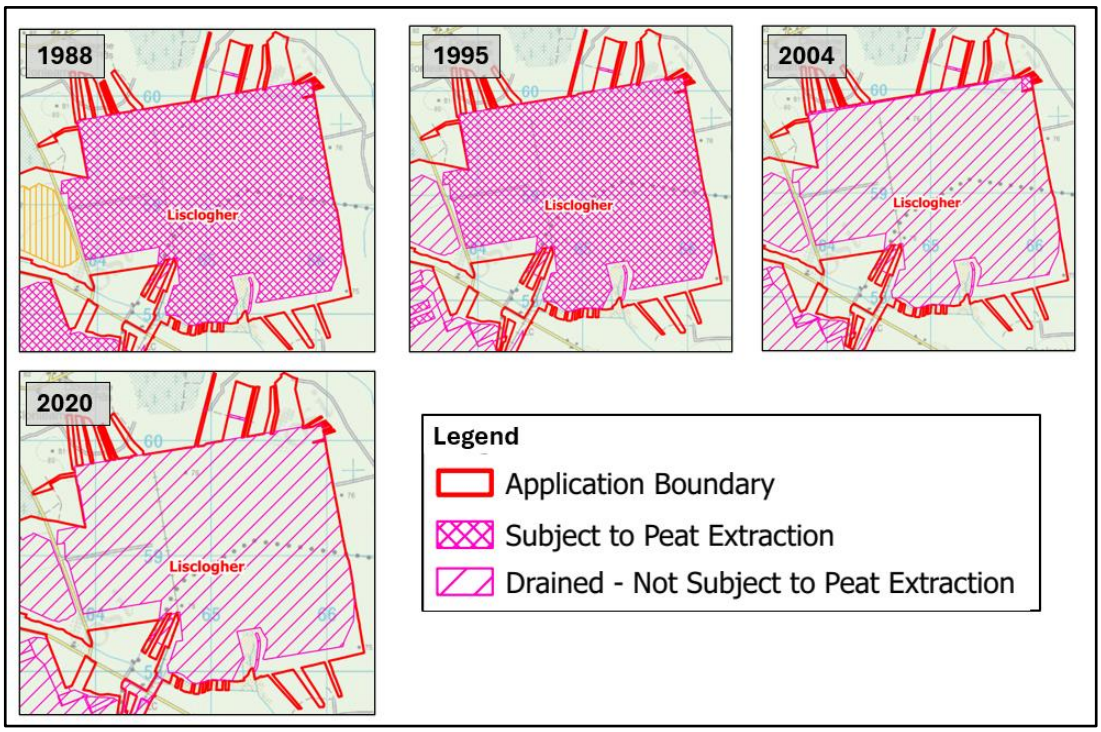


Figure 12-6 Evolution of Peat Extraction Activities at Lisclogher Bog during the 'Peat Extraction Phase' (Figure produced from extracts of Peat Extraction Activities maps provided by Bord na Móna, 2024)

Lisclogher West Bog

As shown in Figure 12-7 below (and as depicted in Table 4-2 of Chapter 4), main drainage was installed pre-1988 and drainage was complete post 1988 (as detailed in Section 4.3.2). The majority of the bog was neither drained nor subject to peat extraction in the 1988 baseline, except for a small area in the

southern section of the bog that was drained, but not subject to peat extraction. Drainage was complete in 1995 but the bog was never subject to industrial peat extraction.

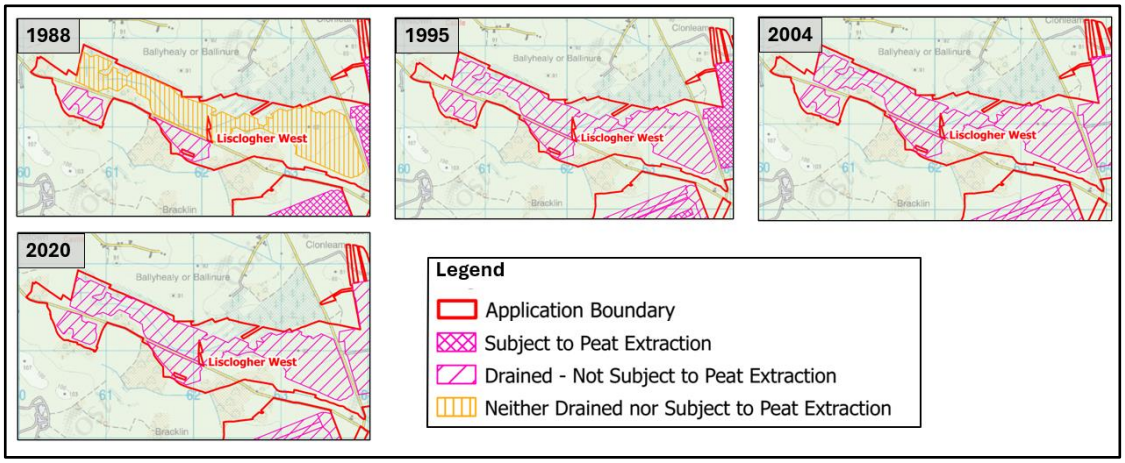


Figure 12-7 Evolution of Peat Extraction Activities at Lisclogher West during the 'Peat Extraction Phase' (Figure produced from extracts of Peat Extraction Activities maps provided by Bord na Móna, 2024)

12.1.2.3 Landscape & Visual Assessment of the Peat Extraction Phase

As described above and shown in the mapping figures, some areas of the Application Site remained 'Subject to Peat-Extraction' until extraction ceased in 2020 and peat extraction ceased in other areas of the Application Site as those areas became commercially unviable for continued peat extraction. A description of the changes in the landscape of the Application Site throughout the Peat Extraction Phase based upon a review of historic satellite imagery, in combination with the mapping figures above is included in Section 12.3 – *Landscape Baseline & Landscape Evolution.*

Best practice guidance for LVIA (GLVIA3, 2013) states that *"it is important to make sure that the project description provides all the information needed to identify its effects on particular aspects of the environment. For LVIA it is important to understand, from the project description, the essential aspects of the scheme that will potentially give rise to its effects on the landscape and visual amenity".*

From a landscape and visual perspective, the essential aspects of activity and landscape change under assessment during the Peat Extraction Phase are the direct effects on the landscape, most notably:

- The stripping of natural vegetated ground cover.
- Change to the landform from the extraction of material from the ground for both peat extraction, as well as creation of drainage channels; and,
- Fragmentation of former areas of intact raised bog due to further establishment of drainage at Lisclogher West.

Other elements of the Peat Extraction Phase likely to cause landscape and visual effects include:

- Alterations to the visual aesthetic of the Application Site as it changes from a mosaic of bog habitat to a visually homogenous landscape of bare cutaway peat.
- Minor modification of ancillary extraction infrastructure such as machine pass routes and peat stockpiles.
- Use of industrial extraction machinery and vehicles; and,
- Indirect effects result from the change in drainage regimes.

12.1.2.4 Current Phase (June 2020 – Present Day)

Peat extraction activities and all ancillary works at the Application Site ceased in June 2020. Since 2020 the Application Site has been part of an on-going decommissioning programme in accordance with the IPC licence conditions, although minor non-extractive activities have occurred on site, such as:

- Movement and processing of peat stockpiles. All stockpiles from Ballivor were removed by June 2022, with the remainder of peat stockpiles removed from the Application Site by the end of 2023.
- Environmental mitigation and monitoring measures (such as noise, dust, surface water) have been in operation at the application site since April 2000, in accordance with the IPC Licence conditions; and,
- Peatland Climate Action Scheme (PCAS): The PCAS scheme commenced at the eastern side of Carranstown Bog in 2022, and in Lisclogher West in 2023. The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services in the Ballivor Bog Group, principally optimising climate action benefits. PCAS is in addition to the IPC Licence measures, and does not form part of this substitute consent application Please see Chapter 4 and the dedicated PCAS website at the following link: https://www.bnmpcas.ie/ for details.

The potential Landscape and Visual impact associated with the activities mentioned above are inherently minor, particularly in comparison with activities occurring during the Peat Extraction Phase. Other change has occurred at the Application Site since 2020 as the landscape has started to revegetate since peat extraction ceased. A comprehensive description of the landscape of the Application Site in its current state is presented in Section 12-3 – *Landscape Baseline & Landscape Evolution*.

12.1.2.5 Remedial Phase

Bord na Móna have produced Cutaway Bog Decommissioning and Rehabilitation Plans for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under condition 10 of the IPC licence. Please see Appendix 4-2 for details.

Decommissioning activities include removing/disposing/recovering, equipment, waste etc from the Application Site. From a landscape and visual perspective, the essential aspect of this will be the removal of infrastructure such as equipment and facilities.

The Cutaway Bog Decommissioning and Rehabilitation Plans involves the re-wetting of parts of the cutover peatlands as appropriate of the Application Site with an aim of achieving environmental stabilisation and biodiversity colonisation. Re-wetted areas will require low level, intermittent groundworks for activities such as plugging and blocking existing drainage. The Cutaway Bog Decommissioning and Rehabilitation Plans also include targeted revegetation where appropriate. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

12.1.2.6 Potential Future Use – Proposed Ballivor Wind Farm

As detailed in Section 4.10 in Chapter 4, Bord na Móna Powergen Ltd lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarm.ie/). The proposed wind farm is located on Ballivor bog, Carranstown bog, Bracklin bog, Lisclogher bog and agricultural land adjacent to Bracklin bog. The likely significant landscape and visual effects of the proposed Ballivor Wind Farm proposal are comprehensively assessed and reported within the EIAR accompanying the submitted planning application. The assessments in this chapter of this EIAR are cognisant of the likely significant landscape and visual

effects of the proposed Ballivor Wind Farm in the context of potential for cumulative interactions between the works and activities required for implementation of the Remedial Phase and the likely effects resulting from the construction and operation of a wind farm at the Application Site.

12.2 Methodology & Assessment Criteria

This section broadly outlines the methodology used to undertake the landscape and visual impact assessment of the activities (outlined in the previous section under the three differing phases) including a description of the following:

- Guidance and Reference material used to conduct the LVIA.
- Methods for determining the Landscape Baseline and Landscape Evolution; and,
- Methods for Assessing Landscape & Visual Effects.

12.2.1 Guidance and Reference Materials

In 2000, the Department of the Environment and Local Government (DoEHLG) published 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities', which recommended that all local authorities adopt a standardised approach to landscape assessment for incorporation into development plans and consideration as part of the planning process. This document remains in Draft.

In 2002, Ireland signed and ratified the European Landscape Convention (ELC). This introduced a pan-European concept that centres on the quality of landscape protection, management and planning. The Department of Arts, Heritage and the Gaeltacht published a National Landscape Strategy for Ireland in 2015. The strategy aims to ensure compliance with the ELC and contains six main objectives, including undertaking a National Landscape Character Assessment and developing landscape policies.

Although the DoEHLG 2000 guidance remains in draft form, this section of the LVIA has been informed by the landscape assessment guidelines presented in the DoEHLG document as well as other guidelines, such as:

- Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (The Landscape Institute/Institute of Environmental Management and Assessment, UK, 2013) - also referred to as GLVIA3 (LI & IEMA, 2013); and,
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022).

12.2.2 Methods for Establishing the Landscape Baseline & Landscape Evolution

In order to establish the landscape and visual conditions at the Application Site throughout the various phases under assessment in this rEIAR, a desk study was undertaken which identified relevant landscape policy relating to the Application Site. This comprises a review of current and previous county development plans for both County Westmeath and County Meath with regards to landscape character areas, designated landscapes, protected viewpoints and scenic routes. The County Development Plans (CDPs) used to inform the assessment include:

- Westmeath County Development Plan 2002-2008
- Westmeath County Development Plan 2008-2014
- Westmeath County Development Plan 2014-2020
- Westmeath County Development Plan 2021-2027
- Meath County Development Plan 2001-2007
- Meath County Development Plan 2007-2013

- Meath County Development Plan 2013-2019
- Meath County Development Plan 2021-2027

Section 2.3.4 in Chapter 2 of this rEIAR also provides a summary of historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan form 1993.

A review of historic aerial imagery and mapping, Bord na Móna Annual Reports and all publicly available information on land use were also used to establish the baseline characteristics of the Landscape of the Application Site and its evolution between 1988 and present day. A site visit was conducted on the 13th of October 2020 and 6th of August 2020 to determine the condition and characteristics of the Landscape in the 'Current Phase', as well as determining the likely visibility of the Application Site (and likely visibility of extraction activities) from visual receptors in the wider landscape setting.

These investigations (i.e. review of policy, aerial imagery, mapping, reporting, site visit and visibility appraisal) informed the assessment of Landscape and Visual effects.

12.2.3 Methods for Assessing Landscape & Visual Effects

The LVIA methodology used in this chapter utilises clearly documented methods based on the GLVIA3 (LI & IEMA, 2013) guidelines. Due to the nature of activities under assessment across differing timelines (phases), qualitative methods have been employed based upon the information gathered and presented in the Landscape Baseline and Landscape Evolution Section. As part of the assessment, landscape and visual sensitivity is balanced with the magnitude of the change to assess the significance of landscape and visual effects. Residual landscape and visual effects are graded upon an 'impact assessment classification of significance' scale, as defined by the Environmental Protection Agency of Ireland (EPA, 2022).

12.2.3.1 Assessing Landscape Effects

The methodology uses qualitative methods in order to arrive at an assessment, which is based on the Landscape and Landscape Assessment (DoEHLG, 2000) Guidelines as well as the GLVIA3 (LI and IEMA, 2013).

Landscape effects can be described as changes which affect the landscape as a resource. This includes how activities affect the elements that make up the landscape, the aesthetic and perceptual aspects and its landscape character. Landscape effects also relate to changes in the structure of the landscape. Under the GLVIA3 (2013) guidance, the assessment of likely significant effects on landscape receptors includes a judgement on both the sensitivity of the receptor as well as magnitude of the change.

Assessing Landscape Sensitivity

Landscape Sensitivity, which is described in the GLVIA3 (2013) as a combination of the landscape's susceptibility to change as well as the value attached to the landscape. Susceptibility to change can be described as the ability of the landscape receptor (either the overall character, quality of the landscape or a particular landscape feature) to accommodate the development without undue consequences for the maintenance of the baseline (existing) landscape and/or the aims of landscape planning policies and strategies. Landscape value is the importance attributed to a specific landscape receptor or feature. Landscape value is determined through baseline assessments considering a combination of criteria such as designations and local characteristics.

For the purposes of this chapter and the assessment of landscape sensitivity, the following landscape sensitivity ratings are assigned to receptors based upon investigations determined by the investigations included in the Landscape Baseline and Landscape Evolution Section:

- Very High
- High
- Medium
- Low

Assessing Magnitude of Change in the Landscape

The magnitude of change occurring within a landscape is a combination of the visual presence - size and scale - of the change, the extent of the area to be affected, and the duration and reversibility of the effect. The magnitude of change for differing landscape receptors was assessed using the definitions outlined in Table 12-1 below.

Table 12-1 Magnitude of Landscape Change Assessment Criteria

Magnitude of Change	Description
Substantial	Where a landscape will experience the loss of key landscape features or the introduction of uncharacteristic additions over a large area. The changes to the landscape are prominent and large in scale. The level of change has an effect on the overall landscape character. The effects are likely long term and may be irreversible.
Moderate	A more limited loss of or change to landscape features over a medium extent which will result in some change to landscape features and aesthetics. Could include the addition of some new uncharacteristic features or elements that would lead to the potential for change in landscape character in a localised area or part of a landscape character area. Would include moderate effects on the overall landscape character that do not affect key characteristics. The effects could be long to medium term and/or partially reversible.
Slight	The loss of or change to landscape features of limited extent, or changes to landscape character in smaller areas. Changes would not affect key characteristics. The addition of any new features or elements to the landscape would only result in low-level changes to the overall aesthetics of the landscapes. Changes to the landscape are more evident at a local level and not over a wide geographical area. The effects could potentially be medium to short term and/or reversible.
Negligible	A change affecting smaller areas of landscape character including the loss of some landscape elements or the addition of features or elements which are either of low value or hardly noticeable. The effects could be short term and/or reversible.

Landscape Effects Assessment Matrix

The significance of landscape effects was arrived at by combining the magnitude and sensitivity classifications, using the assessment matrix in Table 12-2 below, where landscape sensitivity is shown in the left-hand first column and magnitude of change is shown in the first row at the top of the table.

Table 12-2 Landscape effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA (2022) impact assessment classifications of significance, as outlined in Table 12-6 in Section 12.2.3.2.

12.2.3.2 Assessing Visual Effects

Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people – termed 'visual receptors'. These may result from changes in content and character of views as a result in changes to the landscape. The significance of the effect on visual amenity is a combination of the sensitivity of the receptor balanced with the magnitude of the change occurring within a view.

Visual Receptor Sensitivity

Visual sensitivity balances the sensitivity and susceptibility of the receptor (people or groups of people) as well as the amenity value of the view on offer at a particular location. Visual receptor sensitivity depends on the occupation or activity of the people, as well the extent to which the attention is focused on views and visual amenity, according to the GLVIA Guidelines (2013). Visual receptor sensitivity is assessed as either being Very High, High, Medium or Low, based on the definition of descriptions and examples set out in Table 12-3 below.

Table 12-3 Visual Receptor Sensitivity Assessment Criteria

Sensitivity of Visual Receptor(s)	Description
Very High	Included in this category are viewers that are primarily focused on views from this particular location, such as visitors to popular destinations identified for their outstanding views. Residents in close proximity who have primary views of a scenic quality in the direction of the Application Site.
High	Includes viewers at designated views or landscapes. Viewers such as residents in close proximity to the viewpoint who have primary views that will be in the direction of the Application Site that may not necessarily be of a particularly scenic quality; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes.
Medium	Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Application Site or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.

Sensitivity of Visual Receptor(s)	Description
Low	Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.

Magnitude of Visual Change

The magnitude of the visual change considers a combination of scale of the change, the extent of the area to be affected and the duration and reversibility of the effect, determined by review of the activities conducted at the Application Site, desk studies, as well as the visibility appraisal conducted during a site visit on the 13th of October 2020 and 6th of August 2020. The magnitude of change is determined in accordance with the definitions and descriptions included in Table 12-4 below.

Table 12-4 Magnitude of Visual Change Assessment Criteria

Magnitude of Change	Description
Substantial	Substantial change, where activities (or proposals) result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes instances where activities under assessment (e.g. Peat extraction & associated activities at the Application Site) are fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Moderate	The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where activities under assessment (e.g. Peat extraction & associated activities at the Application Site) is partially visible over a moderate or medium extent, and which are not in close proximity to the Application Site. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Slight	The activities under assessment (e.g. Peat extraction & associated activities at the Application Site) would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Negligible	Any change would only be barely distinguishable from the status quo "do-nothing scenario" in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change.

Visual Effects Assessment Matrix

Table 12-5 below shows the significance of visual effects, arrived at by combining the visual receptor sensitivity and the magnitude of change classifications. Visual receptor sensitivity is shown in the left-hand first column and magnitude of visual change is shown in the first row at the top of the table. This table is used as an indicative tool to assist in determining the significance of visual effects. The significance of visual effect is arrived at using a combination of the matrix shown in

Table 12-5.

Table 12-5 Visual effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA impact assessment classifications of significance (EPA, 2022), as outlined in Table 12-6 below.

Table 12-6 EPA Impact Assessment Significance Classification for Landscape and Visual Effects

Matrix Classification Significance	EPA Significance Classification	EPA (2022) Definition of Significance
Major	Profound	An effect which obliterates sensitive characteristics
Major/Moderate	Very significant	An effect, which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Moderate	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate/Minor	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Minor	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Minor/Negligible	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.

Matrix Classification Significance	EPA Significance Classification	EPA (2022) Definition of Significance
Negligible	Imperceptible	An effect capable of measurement but without significant consequences

After determining the significance of the visual effect using the above visual effects assessment matrix, mitigating factors are taken into consideration to arrive at the final residual effect.

12.3 Landscape Baseline & Landscape Evolution

This Section establishes the conditions and character of the landscape at the Application Site and its wider landscape setting in 1988 and throughout both the Peat Extraction Phase and Current Phase. This includes a review of the landscape policy context and landscape designations pertinent to the Application Site from 1988 to present.

12.3.1 1988 Landscape Baseline – Landscape Character

A description of the baseline condition and extraction activities occurring within each specific bog of the Application Site in 1988 is included in Section 4.4 of Chapter 4 as well as an overview in Section 12.1.2.2. The following text establishes the landscape conditions of the various bogs that make up the Application Site in 1988 and the factors that contribute to their landscape character, landscape value and landscape sensitivity at that time.

In 1988, all of the 'Subject to Peat Extraction' areas of the Application Site (Ballivor Bog; the western portion Carranstown Bog; Bracklin Bog; Lisclogher Bog) included stripped and drained peatland where peat extraction was well-established. The groundcover of these 'Subject to Peat Extraction' areas comprised bare cutover peat and it is likely that the character of the landscape in these areas was similar to that shown below in Plate 12-1 (captured during site visits conducted on the 13th of October 2020 and 6th of August 2020). As discussed in Chapter 7 – *Lands Soils and Geology*, the topographical elevation of bare cutaway peat landscape was at a greater elevation in 1988 than it is currently. The material extracted throughout the Peat Extraction Phase (July 1988 – June 2020) has lowered the landform relative to the surrounding landscape and relative to the baseline profile in 1988.



Plate 12-1 View of the existing site conditions (present day) within the site boundary.

The greatest landscape and visual effects arising from these areas 'Subject to Peat Extraction' had already occurred prior to the baseline of 1988, where the upper acrotelm layer (which comprises the biologically active component of the bog) was removed during the stripping process and drainage ditches were cut. In this regard it is deemed that in 1988 the 'Subject to Peat Extraction' areas of the Application Site were a degraded and modified landscape utilised for peat extraction making them of low landscape value and of low landscape sensitivity.

Several peat extraction areas of the Application Site were not under extraction by 1988. As detailed in Section 12.1.2.2 previously, satellite imagery, mapping and reports from that time indicate that Lisclogher West bog has undergone drainage works prior to the baseline (pre-1988), which were completed post 1988, however, the bog was never subject to industrial peat extraction.

In 1988 the eastern extent of Carranstown Bog and the northwestern extent of Bracklin Bog had been drained, but no vegetation clearance had occurred. Drainage ditches had been created previously (prior to 1988) to drain the upper surface of these bogs by lowering the local water table in order to facilitate commercial peat extraction. Drainage ditches are deep, linear topographical grooves that cut across the landscape of the Application Site. Insertion of drainage ditches, such as those in existence on the Application Site would have slightly altered the physical characteristics of a landscape that would previously have been a raised bog. Altering the drainage regime via insertion of a drainage ditch would dry the topsoil and would ultimately have a knock-on effect on the assemblages of species existent within the peatland habitat, bringing about further minor and localised change in the appearance of the bog and a slight change (although potentially imperceptible) to landscape character. Although the drainage regimes had been altered in Carranstown Bog (east) and Bracklin Bog (north-west) by 1988, the acrotelm layer had not yet been removed at this time. Therefore, these areas would still have had ground cover of high ecological value. On balance, the landscape value and landscape sensitivity of these areas that are 'drained', but not 'stripped' or 'Subject to Peat Extraction' is deemed to be Medium.

In a general sense, the Application Site in 1988 was a highly managed landscape utilised for industrial peat extraction. The character of landscape was heavily influenced by this industry. As well as the expansive areas of bare cutover peat, the Application Site included ancillary infrastructure and features

to facilitate the land use such as railway infrastructure, a peat processing plant, canteen, storage sheds, maintenance buildings, internal machine passes/tracks, 20kV power lines, pumps, silt ponds and drains.

Aerial imagery and reports from 1988 indicate that the perimeter of the Application Site was likely bounded by mature vegetation such as hedgerows, broadleaf woodland and pockets of coniferous forestry as it is today, as well as remnant uncut bog around the edges of the 'Subject to Peat Extraction' areas. The aerial imagery also indicates that the surrounding landscape setting in 1988 comprised an agricultural as well as a scattering of residential settlements aligned along the local road network. In this regard, it is anticipated that the nature and extent of visual screening surrounding the Application Site (boundary vegetation) and nature of the visual receptors present in 1988 was very similar to that which exist today. An appraisal of the visibility of the Application Site from visual receptors in the surrounding landscape was conducted on the 13th of October 2020 and 6th of August 2020 and is reported in Section 12.4 - *Visibility Appraisal*.

12.3.2 Landscape Evolution – Landscape Character of the Application Site During the Peat Extraction Phase (1988 - 2020)

As described above, the Application Site was a managed system in 1988 for industrial peat extraction, this continued throughout the Peat Extraction Phase until peat extraction ceased in 2020. Therefore, all areas subject to Peat Extraction of the Application Site had no opportunity to revegetate, re-wet and mitigate landscape and visual impacts of historic peat extraction activities over time. As detailed in Section 4.5.1.1 of Chapter 4, the total volume of peat extracted from July 1988 to June 2020 is estimated to be 2,400,815 tonnes. The removal of this volume of material caused a substantial direct change on the landscape throughout this phase, as the physical landform was materially altered, gradually the surface of the landscape was reduced to a lower elevation year on year.

As detailed in Section 12.1.2.2, one of the greatest changes to the landscape occurred in Carranstown Bog (east) between 1988 and 1995, and then in the northwest of Bracklin Bog between 1988 and 1995. The vegetated ground cover was stripped from these drained peatlands, and they became active peat extraction areas. The landscape in these areas then transitioned to a landscape of bare cutover peat as the natural ground cover was removed. Peat extraction occurred throughout the Application Site and limited change will have occurred to the character or visual aesthetic of areas Subject to Peat Extraction at the Application Site from the 1988 baseline. In some areas of the Application Site and the following areas were drained and no longer Subject to Peat Extraction:

- West of Ballivor Bog from 2004 onwards, and the majority of the bog by the year 2020
- Majority of the area to the east of Bracklin Bog in 1995, then all except the western area was Drained – Not Subject to Peat Extraction from 2003 onwards.
- Most of Lisclogher Bog was 'Drained-Not Subject to Peat Extraction' from 1995 onwards and the entire bog was drained and Not Subject to Peat Extraction from March 2003 onwards.

The landscape in these 'Drained – Not Subject to Peat Extraction' areas was able to revegetate over time, altering the character of the bare cutover peatland landscape.

A selection of Aerial imagery of the Application Site captured in 1995 and 2004 are presented below and are presented in Appendix 4-4. The imagery indicates the morphology of the Application Site throughout the operational lifecycle of these peatlands as managed, working landscapes for the commercial production of peat.

Aerial Imagery 1995 (Source – Ordnance Survey of Ireland)

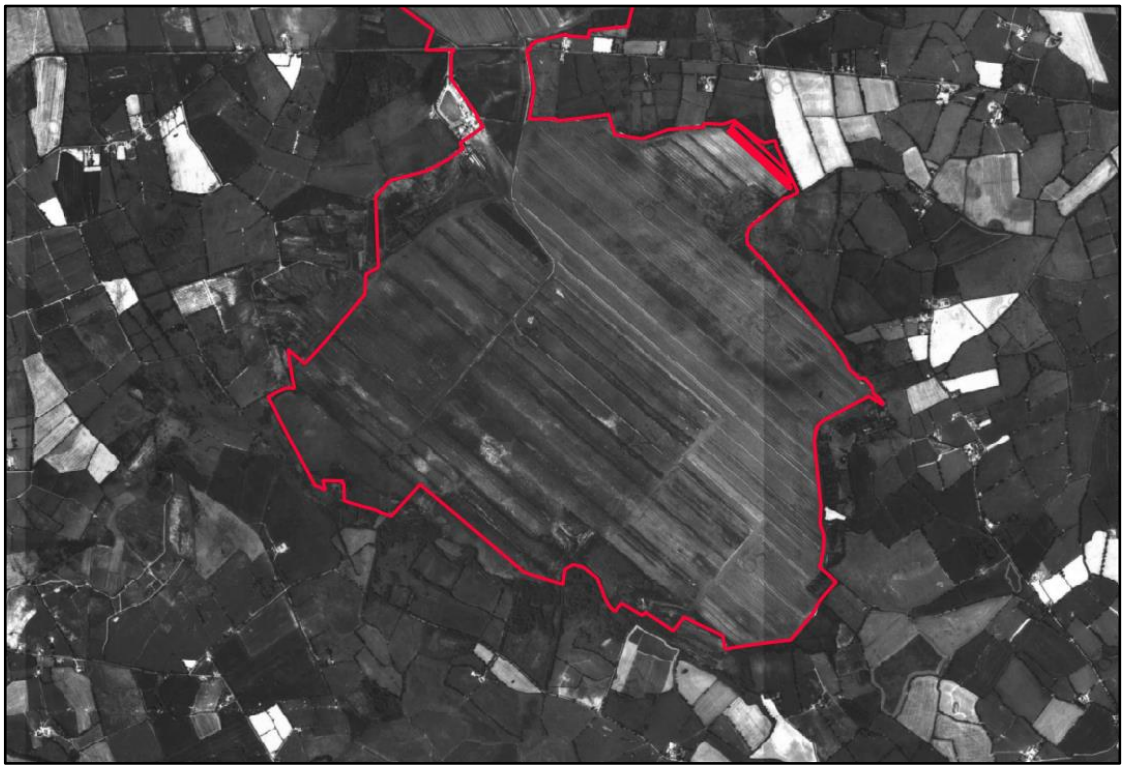


Plate 12-2 Aerial Image of Ballivor Bog 1995 – Osi

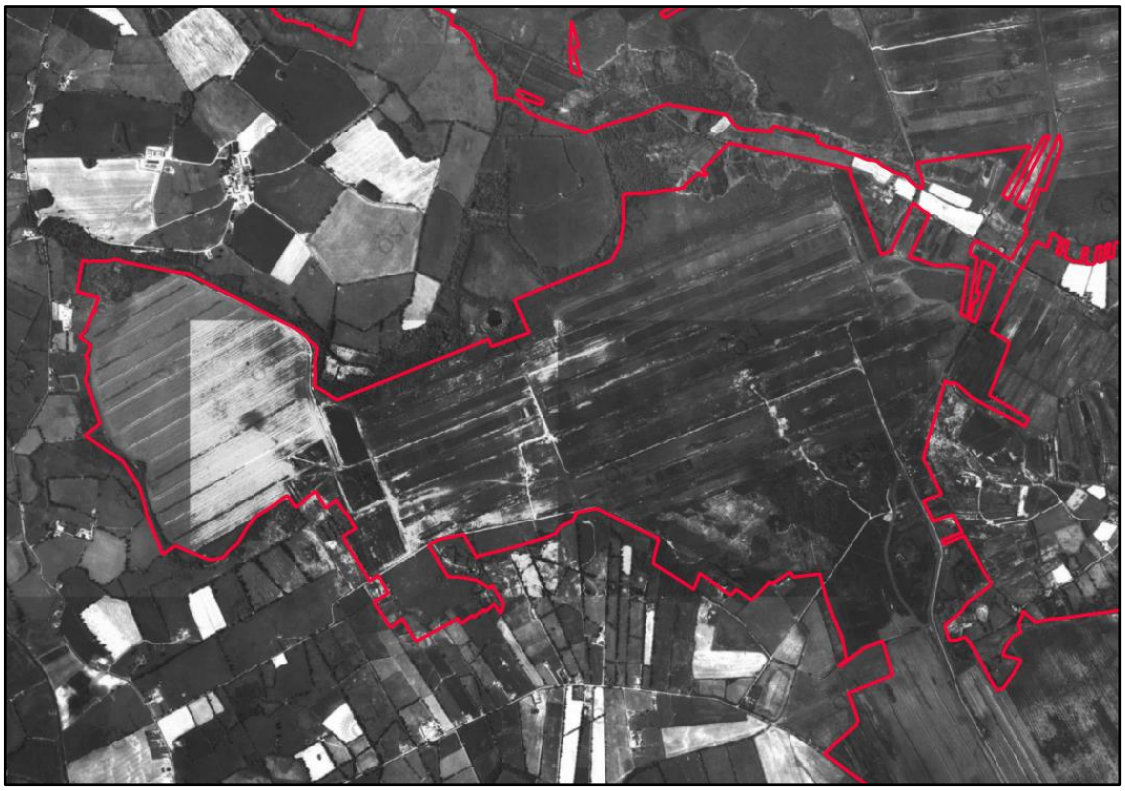


Plate 12-3 Aerial Image of Bracklin Bog 1995 – Osi



Plate 12-4 Aerial Image of Carranstown Bog 1995 – Osi



Plate 12-5 Aerial Image of Lisclogher Bog 1995 – Osi

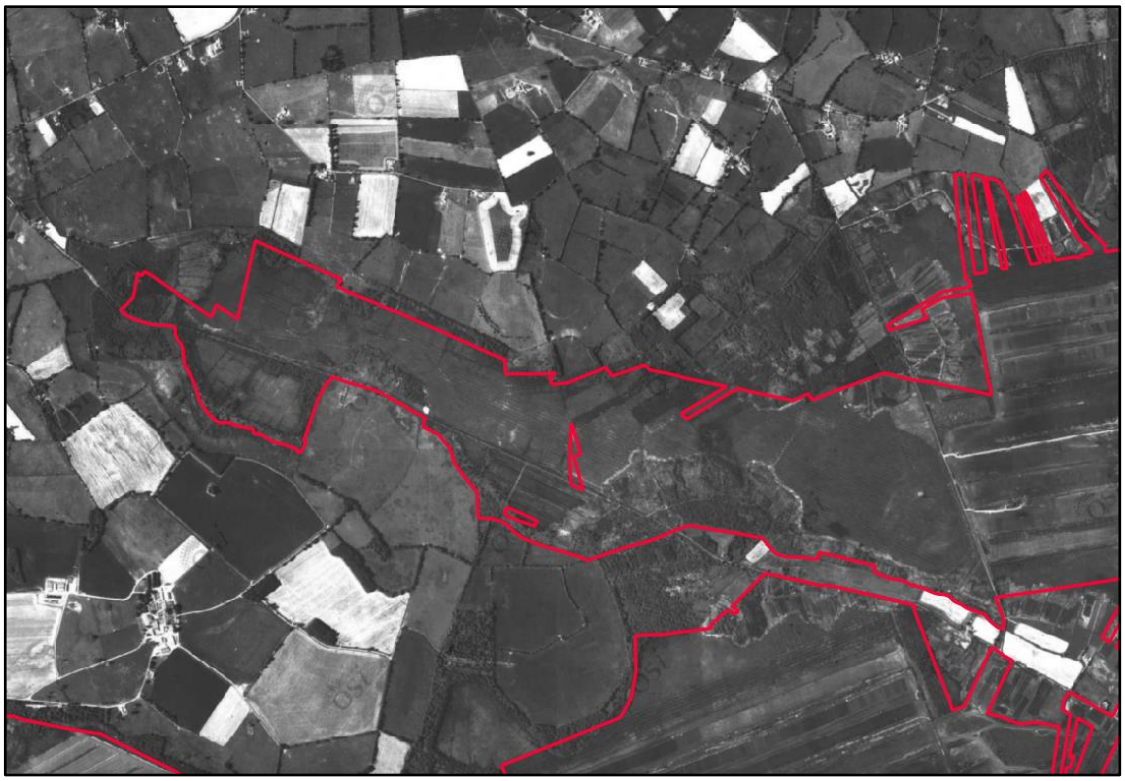


Plate 12-6 Aerial Image of Lisclogher West Bog 1995 – Osi

The Aerial imagery of the Application Site captured in 1995 is shown above. The imagery shows the boglands are an ordered working landscape with well-established extraction areas and deep drainage and transport networks visible within the aerials. Excepting Lisclogher West Bog (Plate 12-6), the aerial imagery from 1995 shows that the surface area of peat extraction includes almost all available areas of the peatlands within the Application Site.

Aerial Imagery 2004 (Source – Bord na Mona, 2024)

The aerial imagery from 2004 (Plate 12-7 to Plate 12-11 below and presented in Appendix 4-4) shows the extent of the Application Site in contrast to the surrounding agricultural landscape. The areas of the Application Site shown in a light brown/yellow colour can be identified as 'Subject to Peat Extraction' areas during 2004 where the upper layers of peat are being extracted. Whereas areas 'Drained-Not Subject to Peat Extraction' in 2004 appear to be a lot darker where lower layers of peat have already been extracted. Often green strips are visible within the imagery where vegetation colonisation is seen to appear along drainage features.



Plate 12-7 Aerial Image of Ballivor Bog 2004 – Osi (Source - Bord na Móna, 2024)

In 2004, the eastern extent of Ballivor Bog is Subject to Peat Extraction, while the western extent of the bog is Drained – Not Subject to Peat Extraction, as shown in the image above and indicated by the peat extraction mapping previously.



Plate 12-8 Aerial Image of Carranstown Bog 2004 – Osi (Source - Bord na Móna, 2024)

The east of Carranstown Bog was drained but never Subject to Peat Extraction, this is indicated by the very dark area on the aerial image above. The remaining area of the bog was subject to peat extraction, as shown in the 2004 aerial image above and the peat extraction mapping previously.



Plate 12-9 Aerial Image of Bracklin Bog 2004 – Osi (Source - Bord na Móna, 2024)

Higher resolution colour aerial imagery of the Application Site captured in 2004 is shown above and below. Due to differences in image quality, it is difficult to directly compare these images with the imagery captured in 1995. However, the imagery indicates that vegetation colonisation is evident across the boglands particularly along drainage corridors or areas where extraction operations have ceased.

Plate 12-9 shows the contrast between the various stages of peat extraction activity occurring in Bracklin Bog in 2004. In the western portion of Bracklin Bog, the uppermost layers are subject to peat extraction, illustrated by the lighter brown colour, whereas the rest of Bracklin Bog has been drained and Not Subject to Peat Extraction. for 1 year at this time and the lower layers of peat have been extracted as illustrated by the darker brown colour.

The image below (Plate 12-10) shows the darker ground cover at Lisclogher Bog which was not Subject to Peat Extraction in 2004. Lisclogher West Bog was drained but never Subject to Peat Extraction and as the natural ground cover remained relatively in-tact it is seen as a dark and homogenous block of land in the aerial imagery below (Plate 12-11).



Plate 12-10 Aerial Image of Lisclogher Bog 2004 – Osi (Source - Bord na Móna, 2024)



Plate 12-11 Aerial Image of Lisclogher West Bog 2004 – Osi (Source - Bord na Móna, 2024)

12.3.3 Landscape Character of the Application Site - Current Phase (2020 - Present)

A site visit was conducted on the 13th of October 2020 and 6th of August 2020 to ascertain the landscape character and condition of the Application Site in the Current Phase. Landscape character refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how people perceive this. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement, and creates the particular sense of place found in different areas.

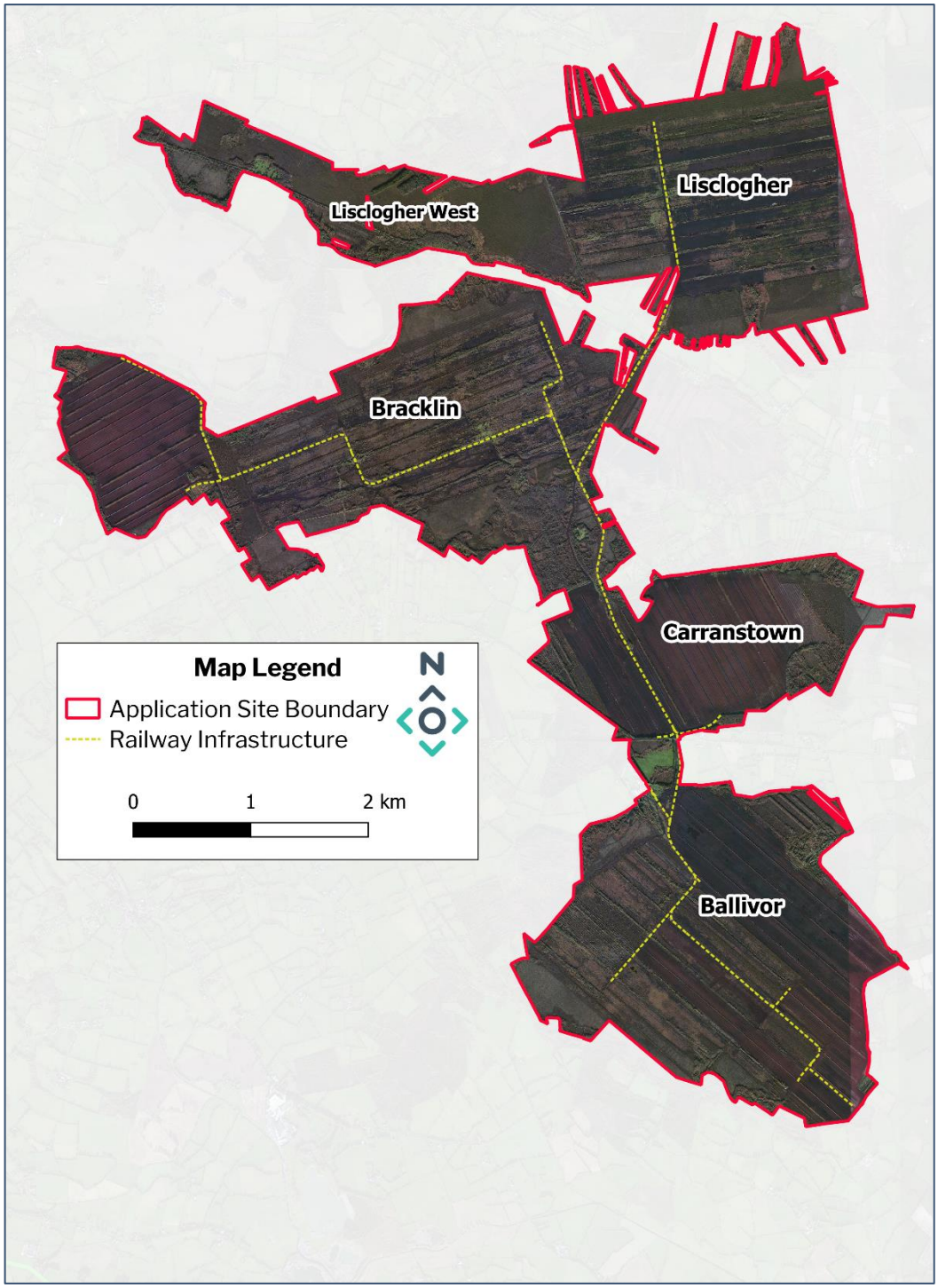


Figure 12-8 Map of the Application Site Boundary overlaid Aerial Imagery Captured in the Current Phase.

Landcover

The landcover within the Application Site comprises a mix of bare cutaway peat, re-vegetated peat, degraded bog, scrub, low woodland, remnants of high bog and a very small area of conifer plantation. Industrial features that facilitated historic peat extraction activities are still evident throughout the Application Site. Industrial elements within the Application Site boundary such as railways infrastructure, and elements outside the Application Site boundary such as the peat processing centre contribute to the industrialised landcover and character of the landscape.

The images below show a variety of vegetation establishment that have occurred in areas of the Application Site where peat extraction has ceased. A variety of ground cover types other than bare cutaway peat (scrub, re-vegetated peat, degraded bog or transitional woodland) commonly occur along corridors where infrastructure such as drains and access roads exist, as well as along extraction plot boundaries were peat banks form elevated berms.



Plate 12-12 Existing conditions at the Application Site, showing the railway track traversing a drained area of cutover bog.



Plate 12-13 Peat Processing centre at the Application Site.

The five subject bogs of the Application Site are narrowly separated by the road network, woodland, linear strips of agricultural land as well as residential properties. The peatlands are inter-connected by a railway that previously serviced peat extraction activities. Although these differing bogs have their own distinctive landscape attributes (e.g. scale, shape and orientation), the general character of the current landscape is very similar within each bog except Lisclogher West Bog.

Lisclogher West Bog

The peatlands of Lisclogher West Bog has never been subject to peat extraction and therefore, the area does not comprise bare cutaway peat or industrial infrastructure. Similar to the rest of the peatlands within the Application Site, the peatlands at Lisclogher West were subject to drainage and therefore its current condition is not that of an unspoiled raised bog in its natural wetland state. However, the vegetation has never been removed and the absence of peat extraction has meant that Lisclogher West has retained many of its natural raised bog features, although there is evidence of degradation, and the high bog is relatively dry with deep field drains. Although there has been no industrial peat extraction on Lisclogher West Bog, northern areas of this peatland are a managed and modified landscape where tracts of commercial coniferous forestry currently exist, which are located outside of the Application Site boundary. A small grass runway and car parking area has been built on the bog which is utilised in a recreational capacity by model aeroplane enthusiasts.

The Bogs of Ballivor, Bracklin, Carranstown and Lisclogher

Plate 12-14 (below) is a typical view across the Application Site in its current condition where relatively recent peat extraction has occurred. The landscape comprises a flat, open and expansive area of bare cutaway peat. A drainage ditch and machine passes visible in the foreground are common features of the landscape of the Application Site. The perimeter of the Application Site is typically bounded by mature mixed woodland as seen across the background of the image below.



Plate 12-14 View of the existing site conditions (present day) within the Application Site.

As shown in the images below, tree colonisation is prevalent throughout the Application Site (particularly on Bracklin Bog) where peat extraction ceased earlier than other areas of the Application Site. This is particularly evident along drainage corridors, where pioneer species such as birch encroach upon the peatland landscape. For a comprehensive description of the existing flora and fauna on the Application Site see Chapter 6 – *Biodiversity (including Ornithology)*.



Plate 12-15 Re-vegetated peatland and Birch tree colonisation on Bracklin Bog



Plate 12-16 Established vegetation along an access track.

Landscape Value and Sensitivity – Existing Conditions

As noted previously in Section 12.1.2.4 decommissioning activities are on-going and will continue into the Remedial Phase, such non-extractive activities continue to influence the character of the landscape during the Current Phase and the Application Site is still to some degree a working landscape.

The site investigation, conducted on the 13th of October 2020 and on the 6th of August 2020 determined that re-vegetation is prevalent and has accelerated throughout the Application Site since peat extraction ceased in 2020 and this has brought a sense of naturalness and wildness to this otherwise highly degraded and modified landscape. The Application Site has a slightly higher landscape value than the bare cutaway peatland that existed throughout the Application Site during the Peat Extraction Phase. However, it cannot currently be considered a wetland or peatland habitat of high biodiversity value and considering its degraded state it is still deemed to be a landscape of Low landscape value and Low landscape sensitivity.

12.3.4 Landscape Policy Context – Designated Landscape Character Areas, Scenic Routes and Views

In order to provide a comprehensive description of the historic and existing landscape conditions throughout the various Project phases, this section provides an overview of the landscape policy pertaining to the location of the Application Site within current and previous County Development Plans. Provision of the landscape policy context enables assessment of the likely impact of the activities under assessment at the Application Site on landscape policy and designated landscape and visual receptors.

The Application Site straddles the border between County Meath and County Westmeath. Multiple mapping figures presented throughout this section demonstrate the large separation distances between the Application Site and sensitive landscape designations within both counties. Designations such as landscape character areas, scenic views and prospects and landscape sensitivity areas are identified in the relevant development plans and are reported below. Westmeath County Development Plans (WCDP)s dating from 2002 to the most recent plan - 2021-2027 are reviewed. Additionally, the Meath County Development Plan (MCDP) 2001 to the most recent plan - 2021-2027 is also reviewed in this section. Consideration was also given to the historic County Development Plans (CDP) detailed in Section 2.3.4 In Chapter 2 of this rEIAR.

These historic CDPs were not considered material to the assessment of effects in this rEIAR as the landscape policy and designations within each CDP in more recent years is more articulate and defined and has evolved to be so over time. As the European Landscape Convention was only adopted in 2000 and ratified in Ireland in 2002, local landscape policy pre-dating 2002 is less defined.

12.3.4.1 County Westmeath

Westmeath County Development Plan (WCDP) 2002-2008

There are no records of landscape character areas or scenic routes for the 2002-2008 WCDP. Associated mapping was not available online.

Section 2.9.22 of the WCDP 2002-2008 lists objectives relating to landscape and development and outlines that:

> *"In order to safeguard the landscape character of the County, the Council will undertake a study of landscape value and sensitivity, as outlined in the Landscape and Landscape Assessment: Consultation Draft of Planning Authorities (DoELG, 2000). This Landscape Strategy for the County will further inform the development control process and will help to ensure that new developments (including forestry, extractive industry and wind farming for example) can be satisfactorily absorbed within the County's landscape and that degraded areas are not further threatened whilst proposing suitable restorative works."*

The WCDP 2002-2008 lists several scenic views throughout the county as well as designating the following lakeland landscapes as Areas of High Amenity:

- Lough Ree Area
- Lough Lene Area
- Lough Owel Area
- Lough Ennell Area
- Lough Derravaragh Area
- Lough Sheelin Area

The landscape of the Application Site does not comprise any of the High Amenity Areas designated in the WCDP 2002-2008 that are listed above. There are no designated scenic views in the WCDP 2002-2008 located within the Application Site, also the peatlands of the Application Site are not the object of any designated scenic view.

Westmeath County Development Plan (WCDP) 2008-2014

The following development plan for County Westmeath is the WCDP 2008-2014. *Section 2.5* of the WCDP 2008-2014 outlines policies and objectives relating to Environment and Heritage for the county and outlines the following policies relating to lake amenity and the site:

> ***"Policy A:*** *To protect the distinctiveness of Co. Westmeath's lakeside landscapes as an asset for future generations to enjoy and appreciate and to recognise their capacity to sustainably integrate appropriate development within their environs*
>
> ***Policy B:*** *To facilitate and encourage the provision of opportunities for public enjoyment of the lakes for tourism and recreational purposes together with the provision of such facilities in identified suitable locations."*

Figure 12-9 and Figure 12-10 below illustrate the Landscape Character Areas ('LCAs') and Landscape and Visual Designations as set out in the WCDP 2008-2014.

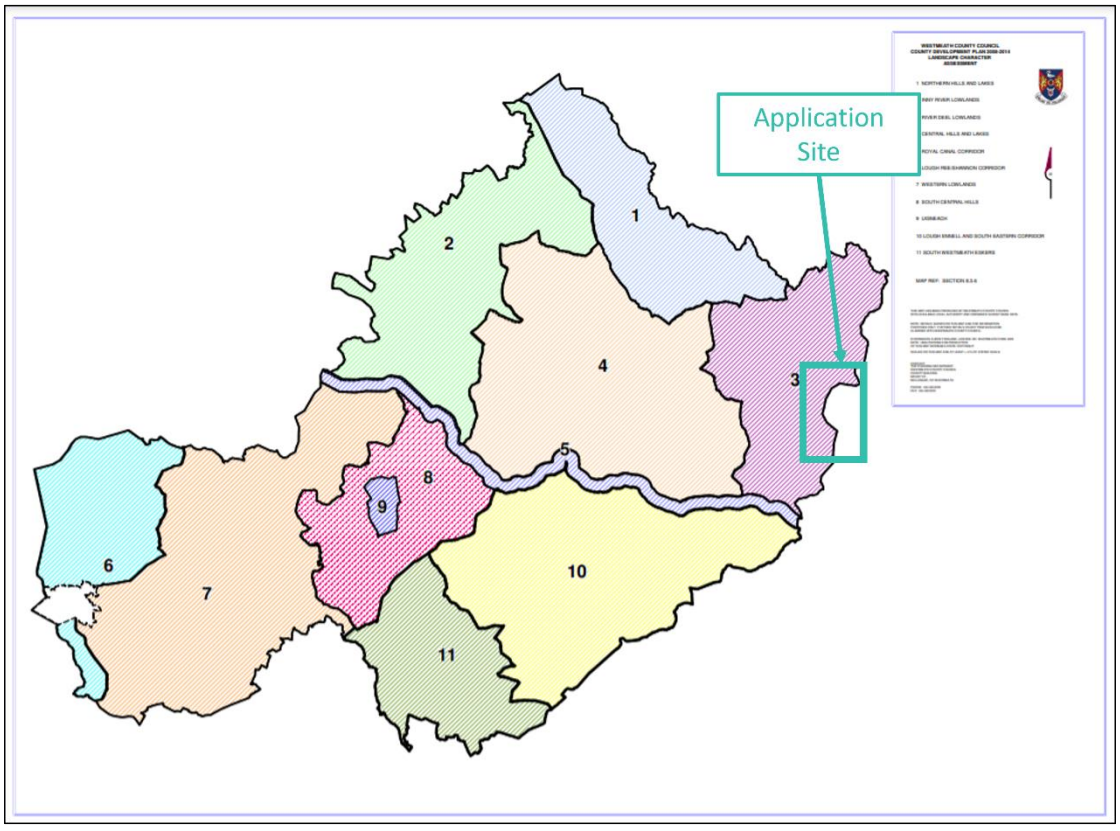


Figure 12-9 Landscape Character Areas Map extracted from the WCDP 2008-2014

As shown in Figure 12-9 above, areas of the Application Site located within County Westmeath are located within Landscape Character Area 3 – River Deel Lowlands, as it is designated in the WCDP 2008-2014. The bogs of the Applications Site contribute to the overall character of this LCA, as they are referenced within the description of LCA 3 in the WCDP 2008-2014:

> *"The area east of Delvin and running south along the Meath Border is characterised by cutover, cutaway and a small tract of intact bog".*

The WCDP 2008-2014 does not designate a sensitivity to LCA 3, and it does not comprise any of the County Westmeath High Amenity Areas. The Application Site has remained within LCA 3 – River Deel Lowlands through to the current WCDP 2021-2027 which is currently in effect.

As shown in Figure 12-10 below, the Application Site is not located in close proximity to any sensitive landscape designations (High Amenity Areas or Scenic Views) reported in the WCDP 2008-2014.

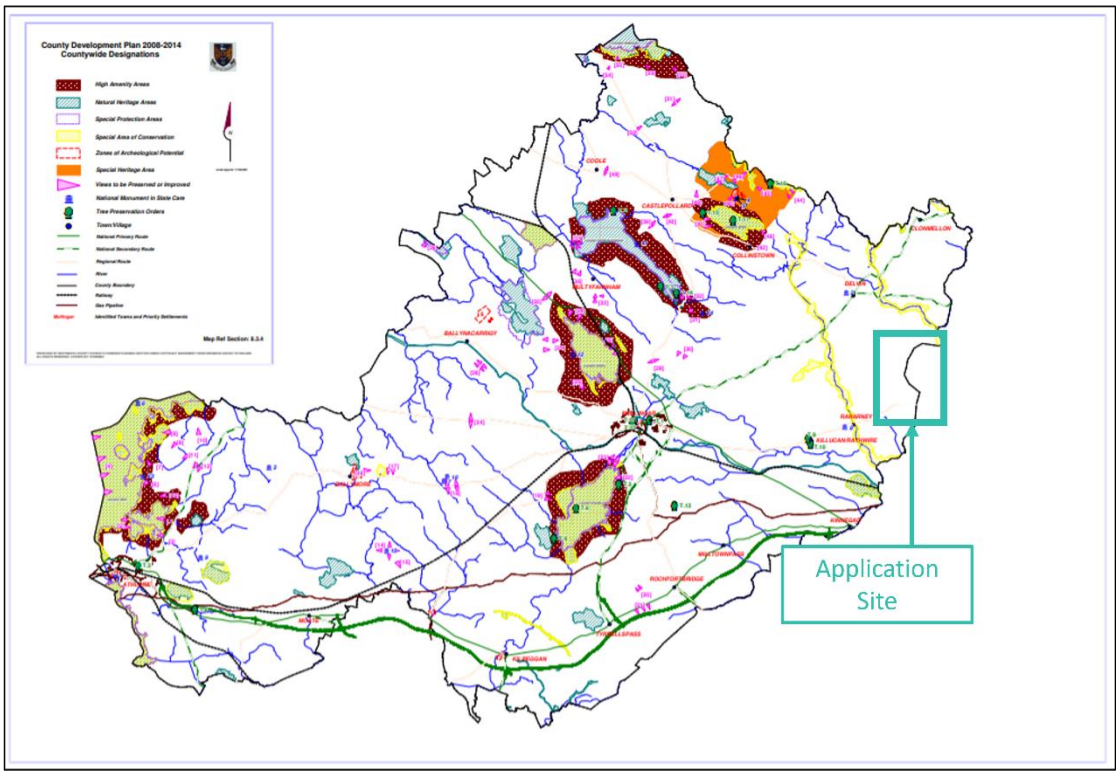


Figure 12-10 Landscape and Visual Designations Map extracted from the WCDP 2008-2014

Westmeath County Development Plan (WCDP) 2014-2020

The next available development plan for Co. Westmeath is the WCDP 2014-2020. In this plan, Westmeath County Council continue their policy regarding the protection and conservation of landscape and recreational amenity of the six lake landscapes designated as High Amenity Areas listed in the previous development plan. The landscape policy within the WCDP 2014-2020 also protects the River Shannon Corridor as well as the designated Views and Prospects which remain consistent with those in the previous development plan (WCDP 2008-2014) that are illustrated in Figure 12-10 above.

Section 6.21 of the WCDP 2014-2020 provides a landscape management policy P-LLM7 specifically related to the future management of peatlands such as that of the Application Site:

> *"To explore with the relevant agencies the future potential of cut away peatlands, including opportunities for habitat creation or amenity and recreation areas such as community woodlands or parklands."*

The Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans are included in Appendix 4-2 of this rEIAR. Promotion of the wetlands and habitat creation is one of the primary objectives of this plan in the Remedial Phase. Implementation of the rehabilitation plan is a vital step towards achieving elements of policy objective policy P-LLM7 and effectively improving the degraded working landscape of the Application Site.

Westmeath County Development Plan (WCDP) 2021-2027

The most current development plan for Co. Westmeath is the WCDP 2021-2027. Policy *CPO 12.64* in *Chapter 12* of this plan relates to the protection and restoration of peatland landscapes such as the Application Site:

> ***"CPO12.64:*** *Protect the county's designated peatland areas and landscapes, including any ancient walkways through bogs and to conserve their ecological, archaeological, cultural, and educational heritage."*

Chapter 13 of the WCDP 2021 to 2027 relates to Landscape Character and Lake Amenities and sets out the county's policy objectives for preservation and enhancement for Areas of High Amenity related to appropriate development:

> ***Policy CPO 13.20*** *- Protect High Amenity areas from inappropriate development and reinforce their character, distinctiveness and sense of place.*

> ***Policy CPO 13.22*** *- Protect lakeshores from any inappropriate development which would detract from the natural amenity of the area.*

There are no areas of High Amenity within or in proximity the Application Site boundary. The closest Area of High Amenity is Lough Lene at 10.2 km north-west from the Application Site boundary at its closest point.

Westmeath County Council reviews and amends designated scenic amenity in the county from what was published previously in the WCDP 2014-2018. The WCDP 2021-2027 provides clear mapping and descriptions of 36 Protected Views which are categorised according to their significance within the county. *Section 13.26* of the WCDP 2021-2027 contains a number of policies and objectives relating to these designated views which are listed in *Appendix 5* of the WCDP 2021-2027 and illustrated in Figure 12-11 below.

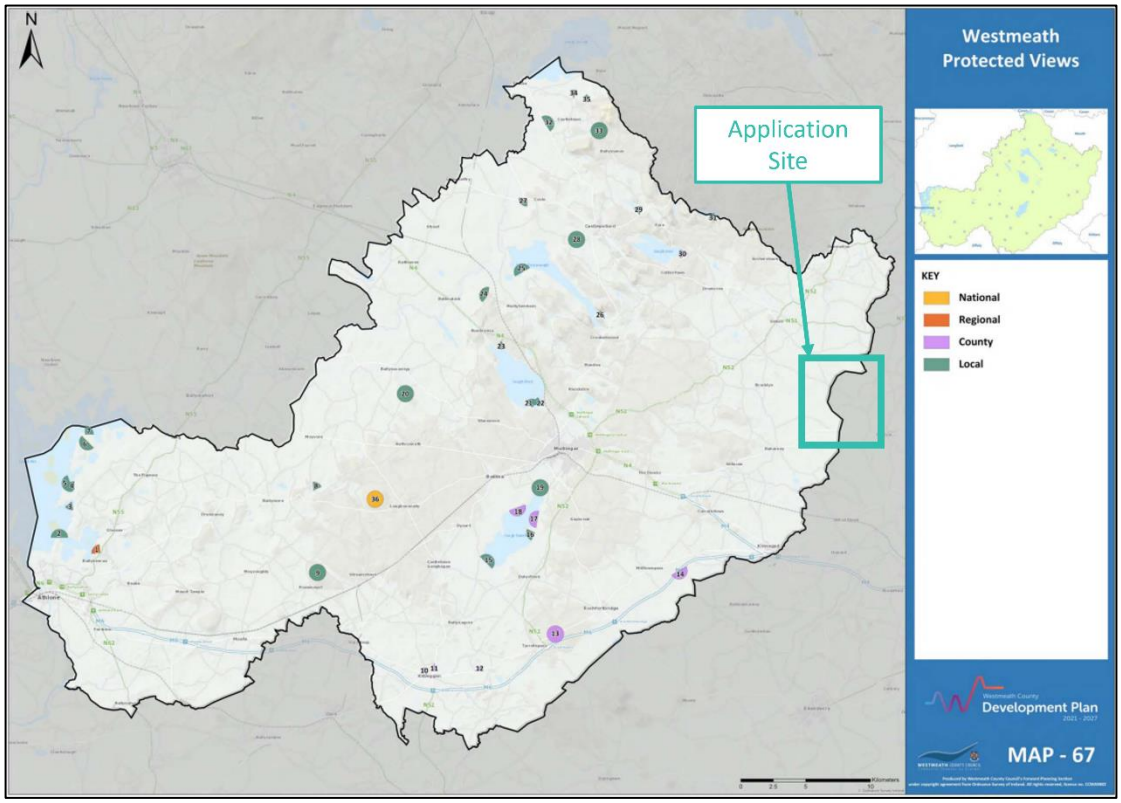


Figure 12-11 Protected Views Map extracted from the WCDP 2021-2027

In relation to Protected Views, the WCDP 2021-2027 states that it is a policy objective of the Westmeath County Council to:

> *"**Policy CPO 13.81** Protect and sustain the established appearance and character of views listed in Appendix 5 of this plan that contribute to the distinctive quality of the landscape from inappropriate development.*
>
> ***Policy CPO 13.81:** Protect and sustain the established appearance and character of views listed in Appendix 5 of this plan that contribute to the distinctive quality of the landscape from inappropriate development."*

There are no designated scenic views located in close proximity to the Application Site and none pertaining to the Application Site itself.

Section 13.26 of the WCDP 2021-2027 identifies the following scenic routes that are also mapped in *Appendix 5*:

- Lough Ree Driving Route
- Mullingar Cycling Hub
- The Táin Trail
- Old Rail Trail/ Greenway
- Royal Canal Way
- Fore Walking Routes
- Westmeath Way

None of the designated scenic routes listed above are located in close proximity to the Application Site. The nearest scenic route is the Táin Trail which starts/ends in Delvin and which is located approximately 5km north-west of the Application Site at its closest point.

12.3.4.2 County Meath

Meath County Development Plan (MCDP) 2001-2007

The 2001 - 2007 Meath County Development Plan (MCDP) identified a number of Areas of Visual Quality (*Section 3.6.3*), and associated sensitivities, primarily on the basis of a desk top study. There are no records of landscape character areas or scenic routes for the 2001-2007 development plan for Co. Meath and associated mapping was not available online.

Meath County Development Plan (MCDP) 2007-2013

Following on from the 2001-2007 MCDP, the 2007-2013 development plan was next issued and provides a better understanding to the development and assessment of landscape character and landscape heritage for County Meath. *Chapter 8* of the MCDP 2007-2013 outlines landscape policies and objectives relating to Heritage and Landscape Character. General landscape policies reported in the MCDP 2007-2013 are listed below:

> ***"HER POL 85:** To ensure that development, particularly in sensitive landscapes, adheres to tailored design guidelines. Sensitive landscapes include demesne villages and LCAs identified as being sensitive.*
>
> ***HER POL 86:** To provide adequate protection of views and vistas that contribute to the appreciation of landscape character.*
>
> ***HER POL 87:** To maintain scenic vistas and panoramic views from key vantage points and towards key landmarks and features within the landscape.*

HER POL 88: *To maintain the visual integrity of sensitive and exceptional landscape value areas.*

HER POL 89: *To encourage the continued sustainable development of rural communities without comprising the physical, environmental, natural and heritage resources of the county.*

HER POL 90: *To protect and enhance the visual qualities of rural areas through the sensitive design of necessary development."*

Figure 12-12 below shows the Landscape Character Areas and areas of High Landscape Sensitivity for Co. Meath, as outlined in the MCDP 2007-2013. As shown in Figure 12-12 (below), where the Application Site is located in County Meath, it is located within *LCA 15 – South West Lowlands* (The LCA is also referred to as *Hill of Down* elsewhere in the MCDP 2007-2013). County Meath LCA 15 is recorded as an LCA of High Sensitivity in this map (Figure 12-12), however it is recorded as Medium sensitivity on Page 17 of the 2007 County Meath Landscape Character Assessment.

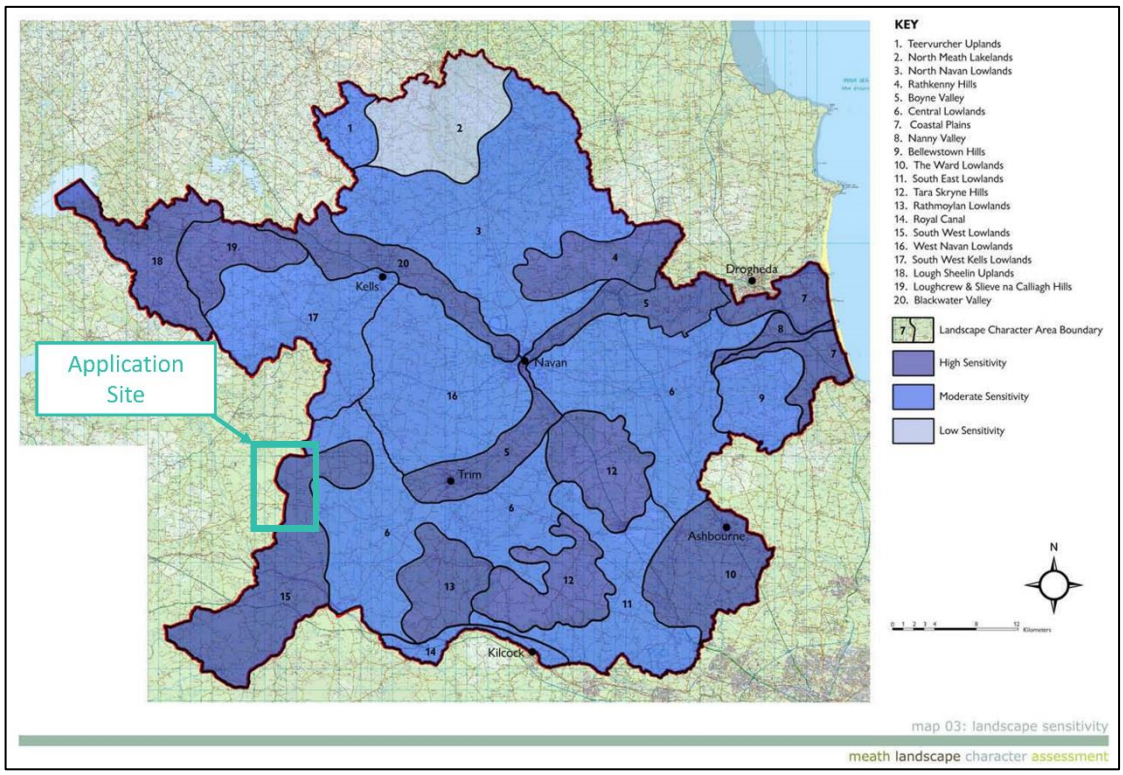


Figure 12-12 Landscape Character and Landscape Sensitivity Areas Map extracted from the MCDP 2007 – 2013

Meath County Council have attributed areas of landscape sensitivity within the county. Landscape Sensitivity is defined in the MCDP 2007-2013 as:

> *"the overall resilience of a landscape character area to sustain its character in the face of change and its ability to recuperate from loss or damage to its components. Sensitivity is evaluated from 'High' to 'Low' and is based on the interaction of individual components such as landform, amount of evident historical features (time depth) and distribution of viewers. A highly sensitive landscape is likely to be vulnerable, fragile and susceptible to change whereas a landscape with low sensitivity is likely to be more robust and/or tolerant of change."*

The Meath Landscape Character Assessment 2007 was amended slightly to form Appendix 7 of the following development plan, the MCDP 2013-2019. Amendments include a table summarising the Value, Importance and Sensitivity of each Landscape Character Area in County Meath (Page 91 of Appendix 7 of the MCDP 2013-2019). The Application Site remains in LCA 15 which is designated as

having 'High' Value, 'Regional' importance and 'Medium' sensitivity. Considering the designation of the LCA as 'Medium' sensitivity in the Landscape Character Assessment 2007 and then 'Medium' sensitivity again in the 2013-2019 MCDP, it is likely that the indication of the LCA as 'High' sensitivity in the mapping figure shown in Figure 12-12 above is likely to have been an error.

The following policy in the MCDP 2007-2013 is noted in relation to designated visual amenity:

> *"**HER POL 114:** To protect from inappropriate development the views identified on the Landscape Character Map 05: Visual Amenity, and the views and prospects as indicated on Map 8.6 (listed table on next two pages)"*

Figure 12-13 below shows Visual Amenity Map 05, as well as the location of the Application Site. As shown in Figure 12-13, there are no county Meath designated views (MCDP 2007-2013) in close proximity to the Application Site.

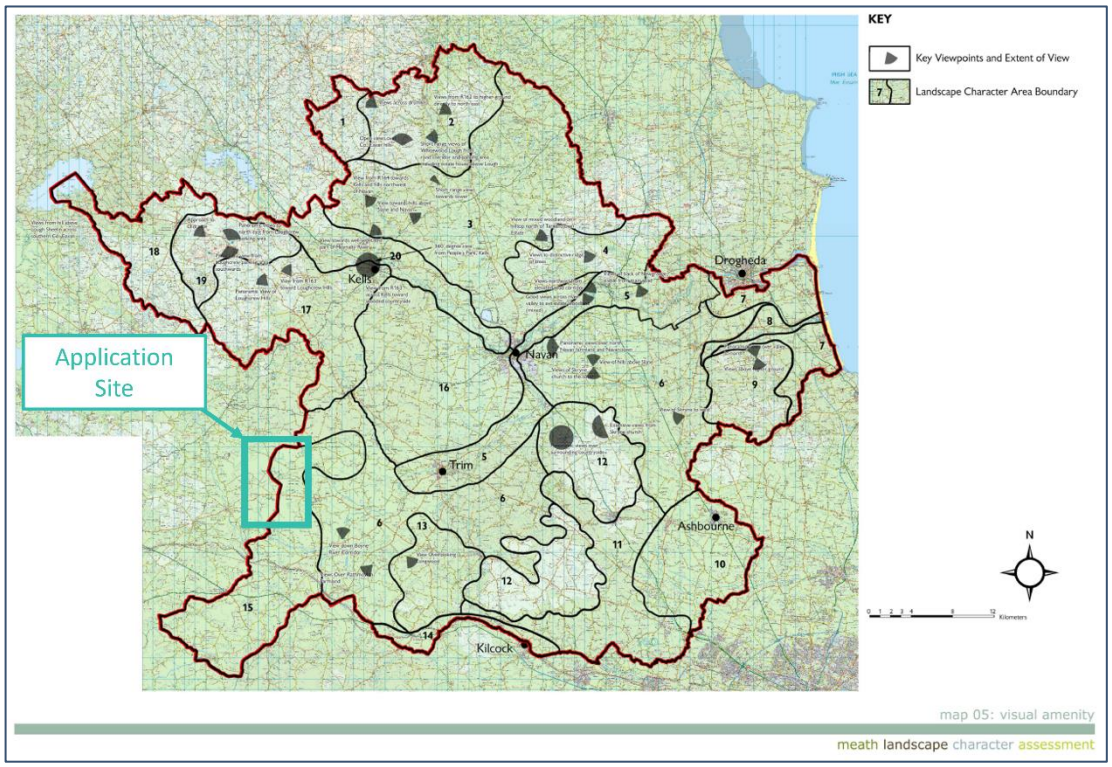


Figure 12-13 Visual Amenity Map 05 extracted from the Landscape Character Assessment 2007 (MCDP 2007-2013)

Meath County Development Plan (MCDP) 2013-2019

Chapter 9 of the MCDP 2013-2019 relates to Culture and Natural Assets and sets out the county's policies and objectives for preservation and enhancement for Areas of Landscape Sensitivity:

> *"**Policy LC SP1** - To protect the landscape character, quality, and local distinctiveness of County Meath in accordance with relevant government policy and guidelines and the recommendations included in Meath Landscape Character Assessment (2007) in Appendix 7.*
>
> ***Policy LC SP2** - To require that any necessary assessments, including landscape and visual impact assessments, are provided when undertaking, authorising, or approving development.*
>
> ***Objective LC OBJ1** - To seek to ensure the preservation of the uniqueness of all landscape character types, and to maintain the visual integrity of areas of exceptional value and high sensitivity.*

***Objective LC OBJ2** - To assess development proposals having regard to the recommendations contained in the Meath Landscape Character Assessment 2007."*

The MCDP designates vantage points from which views and prospects of great natural beauty exist. The council recognises the importance of the scenery and landscape of the county and views that are important for amenity, tourism, and economic and cultural value. The council also recognises the need to protect and conserve views and prospects adjoining public roads and from publicly accessible places throughout the county for the benefit of future generations to enjoy.

The following policy objective relates to visual amenity in the landscape of County Meath:

***Objective LC OBJ 1** - To preserve the views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 from development that would interfere with the character and visual amenity of the landscape.*

Figure 12-14 below, illustrates the location of designated scenic views and their intended direction/focus of view as shown in Map 9.5.1 of the MCDP 2013-2019, as well as the location of the Application Site.

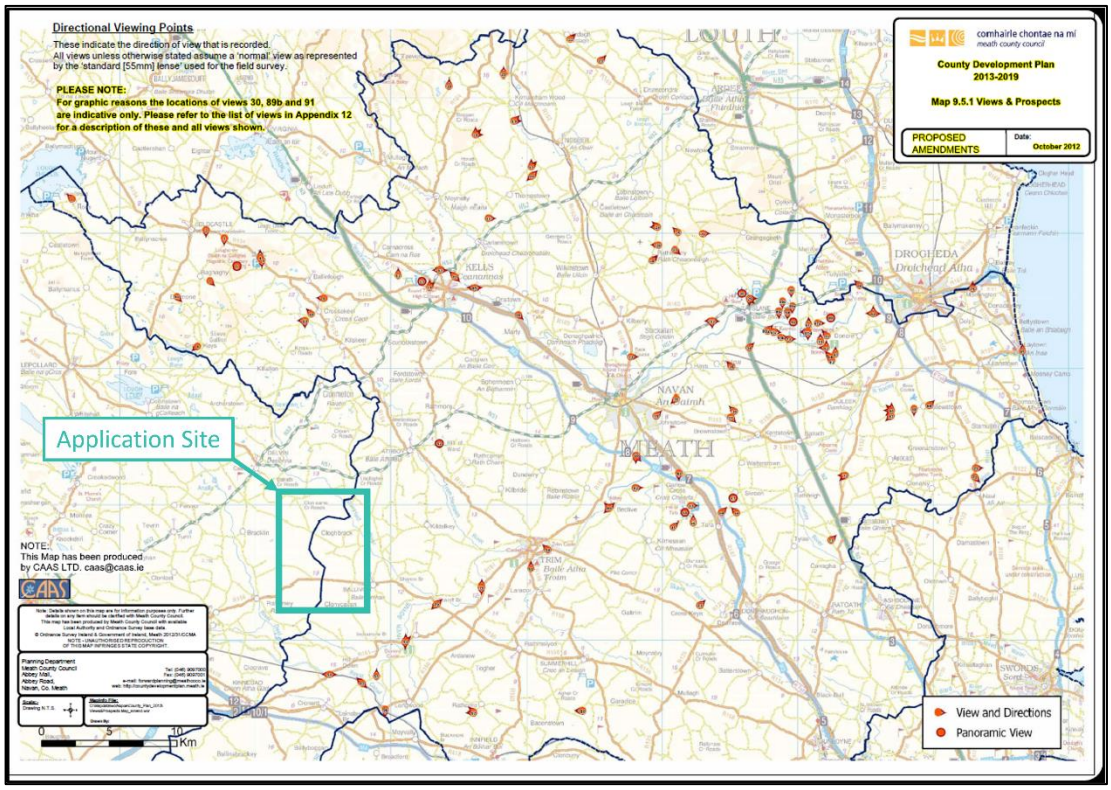


Figure 12-14 Protected Views Map extracted from the MCDP 2013-2019

As illustrated by Figure 12-14, the Application Site is not located in close proximity to any designated Protected Views in the MCDP 2013-2019.

Meath County Development Plan (MCDP) 2021-2027

The MCDP 2021-2027 was brought into effect on the 3rd of November 2021. *Chapter 8* of the current plan (MCDP2021-2017) contains a strategy for Culture and Natural Heritage where landscape policy and objectives are outlined. The landscape policy within the new plan is very similar to those outlined in previous plans, general landscape policy from the MCDP 2021-2027 that are pertinent to the Application site are reported below:

> ***Policy HER 52*** *- To protect and enhance the quality, character, and distinctiveness of the landscapes of the County in accordance with national policy and guidelines and the recommendations of the Meath Landscape Character Assessment (2007) in Appendix 5, to ensure that new development meets high standards of siting and design.*
>
> ***Objective HER 49*** *- To ensure that the management of development will have regard to the value of the landscape, its character, importance, sensitivity and capacity to absorb change as outlined in Appendix 5 Meath Landscape Character Assessment and its recommendations.*
>
> ***Objective HER 50*** *- To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity.*

The 2007 County Meath Landscape Character Assessment comprises *Appendix 5* of the MCDP 2021-2007. No changes have been made to the landscape character assessments or definition of landscape sensitivity reported previously in the MCDP 2007-2013. The Application Site remains in LCA 15 which is designated as a landscape of Medium sensitivity in (page 17) Appendix 5 of the current MCDP 2021-2027.

Section 8.7.4 affords special protection to the high sensitivity landscapes of Tara/Skryne, as well as Loughcrew and Slieve Na Calliagh Hills under policy HER POL 54, designating them as Landscape Conservation Areas:

> *"**HER POL 54:** To protect the archaeological heritage, rural character, setting and amenity of the Tara landscape and Loughcrew and Slieve na Calliagh Hills"*

The Application Site is located a substantial distance from these landscapes (>17 km from Slieve na Calliagh; >25 km from the Hill of Tara).

Policy and objectives relating to the protection of designated views and prospects remains very similar to that reported above from previous development plans. Although the MCDP 2021-2027 states:

> *'it is not envisaged that the designation of a protected view would prohibit all development within the view, rather any development proposed within the view should be designed and located so as not to obstruct the view or be unduly intrusive in the landscape as seen from these vantage points."*

Objective HER 56 relates to the preservation of scenic views and prospects:

> ***Objective HER 56*** *- To preserve the views and prospects listed in Appendix 10, in Volume 2 and on Map 8.6 and to protect these views from* ***inappropriate*** *development which would interfere unduly with the character and visual amenity of the landscape.*

Appendix 10 of the MCDP 2021-2027 lists 94 No. Views and Prospects, the locations of these designated views and prospects shown *Map 8.6* are almost identical to the locations shown in Figure 12-14 above from the previous development plan. There are no designated views and prospects within the immediate vicinity of the Application Site. Designated View 54 is located in closest proximity to the Application Site, as shown in Plate 12-15 Section 12.4.2, the peatlands of the Application Site are not visible from this viewpoint.

12.3.5 Overview of Landscape Characterisation & Landscape Policy

The Application Site is currently a flat peatland landscape with a character heavily influenced by the industrial peat extraction practices historically conducted at the Application Site. The character of the

wider landscape surrounding the site is typical of flat, lowland landscapes located in the midlands of Ireland. The peatlands are located within a rural agricultural landscape comprising fields of pasture, occasional forestry plantations and dispersed rural settlement. The Application Site is located 2.5 km south-southeast of Delvin, 3.7km east of Raharney and 2.2km west of Ballivor Village. The Application Site is partially located in County Westmeath LCA3 – *River Deel Lowlands* and partially located in County Meath LCA 15 - *South West Lowlands.*

The Application Site in its current condition is now an accepted part of the existing landscape character and identity. In the WCDP 2021-2027 a description of LCA 3 refers to the landscape of the Application Site:

> *"areas east of Delvin and running south along the Meath Border is characterised by cutover, cutaway bogs and small tracts of intact bog."*

The wider landscape of Westmeath LCA3 is *"typified by low-lying pasture punctuated with small lakes which are flanked by scrub and wet woodland"* as well as *"The River Deel, the Stonyford River and their hinterlands".* The MCDP 2013-2019 describes County Meath LCA 15 - South West Lowlands as being *"characterised by rolling hills interspersed with beech copses and well-wooded hedgerows dividing rough pasture.... Pasture farmland is dominant although there is rough pasture in the upland areas interspersed with a mix of woodland plantations, small copses and scrubby woodland more prevalent in the south west".* There is no reference to the cutover boglands of the Application Site located in the north-west of the LCA.

Neither County Westmeath LCA 3 or County Meath LCA15 are currently designated as landscape character areas of high sensitivity, and they do not comprise any notable landscape features of national or county importance. The Application Site is not currently located within or near any designated High Amenity landscapes or Landscape Conservation Areas.

12.4 Visibility Appraisal

Due to the large surface area of the Application Site (2,421 hectares), the peatlands and historical peat extraction activities will have been visible across an extensive portion of the local landscape. In most instances, the cutover peatlands are only visible from localised receptors in the immediate vicinity of the Application Site. The abundance of mature woodland surrounding the perimeter and margins of the peatlands screen the site from view within the wider landscape which is very flat in nature. Visibility of the Application Site was appraised during a site visit on the 13th of October 2020 and 6th of August 2020

12.4.1 Views to and from the Application Site

As shown by Plate 12-1 and Plate 12-12 in the previous section, there are long-ranging and unrestricted views across the open and flat peatlands of the Application Site, particularly where ground cover comprises bare cutaway peat. Excepting entrance routes, the Application Site is predominantly surrounded by mature treelines of broadleaf and conifer. The relatively dense woodland enclosing the Application Site acts as a physical barrier, restricting views (as well as buffering noise and dust) both into and out of the site.

During a route screening assessment conducted on the 10th and 11th of June 2021, the roads immediately surrounding the site were driven to assess visibility towards the Application Site. The Application Site and its surrounds are located within a rural landscape setting, characterised by agricultural fields outlined by field boundaries consisting of treelines and hedgerows. Views towards the site from the road network surrounding the site are shown in the images below.

Plate 12-17 shows a view from the R156 west of Carranstown Bog where views into the Application Site are restricted by the dense broadleaf woodland lining the roadway. Plate 12-18 shows a more open,

unrestricted view towards the Application Site where there is limited roadside vegetation screening. Even though roadside screening is limited (Plate 12-18), visibility of the Application Site is obscured by the intervening field and its mature boundary vegetation.



Plate 12-17 View from the R156 west of Carranstown Bog.



Plate 12-18 View towards the Application Site from local road north of the village of Ballivor

The main entrance point to the Application Site in 1988 was entrances north and south off the Ballivor-Raharney (R156) road. This site entrance still exists today and is one of the only locations where there is any extended open visibility into the Application Site from a public road. As shown below in Plate 12-20 there are open views to the north from the R157 where large areas of bare cutover peat of Carranstown bog is visible. It is noted that visual receptors travelling on the R157 would only have this view momentarily as they pass this entrance to the Application Site.



Plate 12-19 Entrance to Ballivor Bog and Carranstown Bog from the R156 Regional Road



Plate 12-20 Open views into the Application Site from the Site Entrance on the R156 regional Road.

The most sensitive visual receptors likely to have most visibility of the Application Site are local residents who live in close proximity to the site. The site visit in 2020 determined that in most instances, visibility of the Application Site was screened from view by well-established, dense boundary vegetation located both within the curtilage of local residents and along the site boundary and local field boundaries.

12.4.2 Visibility from Designated Scenic Amenity

The peatlands within the Application Site are not the subject of any designated protected views and prospects or scenic routes. Designated County Meath View 54 is located approximately 3.8 km south of Ballivor Bog. This designation is located on the R161 regional road as it crosses the Royal Canal and is the most proximate designated view to the Application Site. As shown in Figure 12-15 below, the peatlands of the Application Site are not visible from this viewpoint due to screening existent within the intervening landscape.



Figure 12-15 View towards the Application Site from County Meath Scenic View No. 54 on the R161 as it crosses the Royal Canal (image captured in 2021).

The lands of the Application Site are potentially visible from several protected views which are elevated vantage points at a substantial distance away. For instance, County Meath Designated Protected View No. 6 at Slieve Na Callaigh is a panoramic view of the landscape from an elevated location 18km north of the Application Site. A zoomed in view towards the Application Site from the designated scenic view at Slieve Na Callaigh is shown in Figure 12-16 below, the location of the peatlands within the landscape is bounded by a green and white annotation. In this instance, the peatlands of the Application Site comprise a narrow, horizonal section of the landscape visible within the panoramic view. No areas of cutover bog are visible in Figure 12-16 and it is unlikely that the boglands would be discernible with the naked eye on even the clearest day. Due to the highly vegetated nature of the flat landscape surrounding the Application Site, it is not likely that the extraction areas (cutover bog and degraded peatlands) of the Application Site will be visible from any distant scenic amenity designations, even from elevated locations as shown in Figure 12-16.



Figure 12-16 View towards the Application Site from County Meath Scenic View No. 6 at Slieve Na Cailliagh (image captured in 2021)

12.4.3 Potential Changes in Visual Amenity - Peat Extraction Phase to Current Phase

As noted previously, review of aerial mapping data and site reports indicate that visibility into the Application Site would have been very similar throughout the Peat Extraction Phase as they currently are.

Topographical Change

It is noted that the extraction activities that occurred throughout the Peat Extraction Phase have gradually lowered the base elevation of the Application Site in comparison to the flat agricultural plains surrounding the site. Therefore, the peat extraction activities and all ancillary works in 1988 and during earlier stages of the Peat Extraction Phase may have been conducted at a higher elevation and may have been marginally more visible during that time. There are multiple other factors (e.g., character and nature of views into the site) influencing likely visibility during the Peat Extraction Phase that cannot be objectively assessed retrospectively. It is likely that the change in elevation of the Application Site is so marginal in this context and will have had a negligible influence on the likely significance of visual effects relating from views into the Application Site.

Changes to the Visual Aesthetic of the Site

The visual aesthetic of the Application Site has changed since cessation of peat extraction in 2020. This is primarily attributed to the large areas of barren and bare cutover peat which have been allowed to revegetate, consequently changing the visual aesthetic to a landscape that of a more natural and wild nature. Whilst decommissioning activities are still occurring in the Current Phase, the visual effects of extraction activities in terms of extensive operation of machinery, use of railway infrastructure and associated dust have been reduced since peat extraction ceased.

12.5 Assessment of Significant Landscape and Visual Effects

The assessment of landscape and visual effects arising at the Application Site throughout the various phases reported below was determined using the Methodology reported previously in this Chapter - *Section 12.2.*

12.5.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to

natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

12.5.2 Peat Extraction Phase – Landscape and Visual Effects

Areas where Industrial Peat Extraction had occurred Prior to 1988

As established in Section 12.3.1 '1988 Landscape Baseline', the majority of the peatlands under assessment comprised of drained, stripped, bare cutover peat. Where peat extraction activities and all ancillary works had been occurring prior to the 1988 baseline, the landscape was at that time considered to be degraded and of low sensitivity. In these areas (Ballivor Bog; the western portion of Carranstown Bog; Bracklin Bog; Lisclogher Bog) the greatest landscape and visual effects had already occurred, and the only change to the baseline landscape conditions throughout the Peat Extraction Phase was the continued extraction of material.

In terms of direct landscape effects, the removal of peat from the Application Site throughout the Peat Extraction Phase changed the physical fabric of the landscape by removing material and altering the topographical profile of the landform year on year. The magnitude of this change in these areas is deemed to be 'Moderate', this is balanced with a 'Low' sensitivity, resulting in negative landscape effects of 'Slight' significance.

The degree of visual change occurring on these areas already subjected to intensive peat extraction would be 'Negligible'. Also as established in Section 12.4 of the Visibility Appraisal there is very limited visibility into the Application Site from sensitive visual receptors or any scenic amenity designations. Therefore, no significant visual effects are determined to have occurred at Ballivor Bog, the western portion of Carranstown Bog, Bracklin Bog & Lisclogher Bog during the Peat Extraction Phase.

Lisclogher West Bog

Lisclogher West Bog is deemed to be a landscape receptor of High sensitivity during the 1988 baseline, as it included large areas of intact raised bog. No industrial peat extraction activities ever occurred on the bog, but it was subject to minor drainage work pre-1988, which was completed in 1995. However, the natural vegetation cover was never cleared. The construction of drainage ditches caused a change to the landscape as ditches are cut across the bog, although this only materially altered a relatively small geographical proportion of Lisclogher West Bog. It is noted that the acrotelm layer, the biologically active part of the bog, was retained. As reported in Chapter 6 – *Biodiversity (including Ornithology)*, alteration to the drainage regimes would have an impact on the wetland habitat and the species assemblages present, consequently resulting in very minor change to the ground cover of bogland habitat and therefore an indirect effect on the landscape as well.

As reported previously in Section 12.3.3, in 2013 two small grass take-off and landing strips (150m x 7m and 75m x 7m) were laid in Lisclogher West bog for recreational use by model aeroplane enthusiasts, as well as a small car parking area.

It is considered that the drainage activities and construction of the recreational area in Lisclogher West Bog caused a 'Slight' magnitude of change during the Peat Extraction Phase. Slight is balanced with the High landscape sensitivity of this bog during the 1988 baseline (1988), therefore resulting in Negative Landscape Effects of 'Moderate' significance.

The degree of visual change in Lisclogher West bog as a result of the drainage would have been 'Slight' as drainage ditches are now seen to cut across the land. Any visual changes to the bog habitat as a result of changes in drainage and biodiversity are likely to be imperceptible to a non-specialist receptor. The on-site visibility appraisal determined that there is an absence of sensitive visual receptors (e.g. residences) in proximity to Lisclogher West Bog and the local road running along the southern perimeter is of very low traffic density. Visual receptors using the airstrip are not deemed to be of particularly high sensitivity. In a general sense, visual receptor sensitivity is deemed to be 'Low' and visibility of the bogland is very limited. Therefore, Low sensitivity and Slight magnitude of change is balanced to determine visual effects occurring in Lisclogher West Bog were 'Not Significant' during the Peat Extraction Phase.

Northwest of Bracklin Bog & East of Carranstown Bog

As reported in Section 12.1.2.2, the northwest portion of Bracklin Bog (c. 58 hectares) and the eastern portion of Carranstown Bog (c. 117 Hectares) comprised drained peatland only in the 1988 Baseline. As reported earlier in this chapter (see Section 12.3) these drained peatland landscapes (likely to be of similar condition to the current state of Lisclogher West Bog) are deemed to be of Medium landscape sensitivity in their 1988 baseline state. In the years immediately following 1988 during the Peat Extraction Phase, the bogs had their vegetation cleared and industrial peat extraction commenced and continued until 2020, although some areas of Carranstown Bog were drained and Not Subject to Peat Extraction. in that time. These bogs therefore transitioned from a drained peatland landscape (likely to be of similar condition to the current state of Lisclogher West Bog) to a landscape of bare cutover peat (much like the rest of the Application Site at that time). The loss of vegetated ground cover, extraction of material and associated extraction activities would have caused a substantial magnitude of change to the landscape of these bog areas.

Substantial change to the landscape balanced with medium sensitivity equates to 'Significant' negative, direct landscape effects. Although it is stressed that these significant direct landscape effects are localised to these boglands (northwest portion of Bracklin Bog & eastern portion of Carranstown Bog) these are the only locations within the Application Site that commenced peat extraction after 1988, and they represent a very small proportion (approximately 10%) of the overall Application Site.

With regards to visual effects, the northwest portion of Bracklin Bog is isolated from sensitive visual receptors. The 2021 visibility appraisal determined that it is currently bound by dense woodland with very limited visibility into the bog from surrounding road network and residential receptors. It is likely that viewing conditions into this area of the Application Site in 1988 (and throughout the Peat Extraction Phase) would have been very of similar to the present day. However, for the avoidance of doubt and the purposes of this assessment, it is assumed that there might be some slight visibility from low sensitivity receptors in the surrounding landscape. Although there is a substantial magnitude of change to the visual aesthetic of this northwest portion of Bracklin Bog itself, there is only likely there was a 'Slight or Moderate' change to visual amenity in the surrounding occasional intermittent views were available into the Application Site. Considering the Moderate (potentially much lower) magnitude of change and low sensitivity of receptors, it is deemed a negative visual impact of 'Slight' Significance was deemed to arise at the Northern portion of Bracklin Bog during the Peat Extraction Phase.

As shown in the images captured during the 2021 visibility Appraisal (See Section 12.4) there are open views to the north, into Carranstown Bog from the R156 Regional Road, including views of the eastern portion of Carranstown Bog. As this was also the location of the site entrance in 1988, it is assumed that the openness of views into the Application Site from this location would have been similar to current conditions, and as it was during the Peat Extraction Phase. Therefore, the transition of this drained peatland (Carranstown Bog - eastern portion) to bare cutover peatland, as well as visibility of regular peat extraction activity would cause a 'Substantial' change to views from visual receptors travelling on the R156. Visual receptors on the R157 are deemed to be of Low sensitivity. However, it is likely that some residential receptors (high sensitivity receptors) in close proximity to the eastern portion of Carranstown Bog may have had views into the Application Site in 1988 or during the Peat Extraction Phase, therefore, on balance visual receptor sensitivity is deemed to be 'Medium'. It is initially determined that a negative 'Significant' visual impact was deemed to arise at the eastern portion of Carranstown Bog during the Peat Extraction Phase.

Certain mitigating factors should be considered before arising at a residual visual impact. Firstly, the open views from R156 discussed above comprise both the eastern and western portion of Carranstown Bog. In 1988, the western portion of Carranstown Bog was subject to peat extraction and bare cutover peatland would comprise a substantial part of the existing views. Therefore, the changes would be an addition to the existing trend of peat extraction within the existing views. Secondly, it is noted that visual receptors travelling the R156 Regional road would only experience momentary, intermittent views into the eastern portion of Carranstown Bog. Most residential receptors are set back from the east of Carranstown Bog and historic satellite imagery indicates that features such as forestry and woodland would screen most views into the bog as they do today. On balance, it is considered that Residual Visual effects upon this scenic amenity are of 'Moderate' significance.

Impacts on Designated Landscape Character Areas

Designated Landscape Character Areas were only established in 2008 for Co. Westmeath and 2007 for County Meath. By this time most of the Application Site was Drained and Not Subject to Peat Extraction, however, peat extraction activities and all ancillary works was continuing to occur in a few selected areas of the Application Site (approx. 27% in 2004). Therefore, no negative change occurred to the landscape character of either County Westmeath Landscape Character Area 3 – River Deel Lowlands or County Meath LCA 15 – South West Lowlands since their inception. Due to the limited visibility of the peat extraction activities and all ancillary works beyond roads and residences in the immediate vicinity of the Application Site, no significant visual effects occurred from any scenic amenity designations or any other sensitive receptors existent in the wider landscape.

12.5.3 Current Phase – Landscape and Visual Effects

Cessation of peat extraction activity in 2020 has enabled the landscape of the Application Site to continue to re-vegetate and to some degree mitigate landscape and visual effects over time. However, the landscape is still a degraded bare – cutover peat site of low sensitivity, and it is not a functioning wetland. Revegetation has caused both a 'Slight' degree of change to the landscape and 'Slight' degree of change to the visual aesthetic of the Application Site and surrounding visual amenity. Decommissioning activities are on-going causing 'Slight' landscape and visual effects to arise. On balance landscape and visual effects during the 'Current Phase' are deemed to be 'Not Significant'.

12.5.4 Remedial Phase – Likely Landscape and Visual Effects

The primary activity of the Remedial Phase is to rewet cutover peatland in order to re-establish a naturally functioning wetland and peatland ecosystem. This will require low level, intermittent groundworks for activities such as plugging and blocking existing drainage. The Cutaway Bog Decommissioning and Rehabilitation Plans also includes targeted revegetation where appropriate. Continued decommissioning works of existing peat extraction infrastructure is also included for in the Remedial Phase.

It is likely that the works required to decommission peat extraction infrastructure and implement the remedial phase will cause temporary, negative landscape and visual effects of 'Imperceptible' significance.

As the bogland is re-wetted and the peatland ecosystem re-establishes as a result of remedial works there will be a positive change to the landscape of the Application Site. The visual aesthetic of the Application Site has changed since cessation of peat extraction activities in 2020. This is primarily attributed to the large areas of bare cutover peat which have been allowed to revegetate, consequently changing the visual aesthetic to a landscape that of a more natural and wild nature. The intention of the remediation plan is to continue to encourage this process and ensure that it is successful. Provided the Cutaway Bog Decommissioning and Rehabilitation Plans are implemented, there will be a 'Slight Positive' landscape and visual impact when compared to the 1988 baseline. Even in the absence of these plans, the natural revegetation process on the bare cutover peat areas will contribute to a positive landscape and visual impact, albeit at a slower rate. This spontaneous growth of vegetation is expected to gradually improve the visual aesthetics and landscape quality of the site.

12.6 Cumulative Landscape and Visual Assessments

In this section landscape and visual impacts at the Application Site are assessed in combination with other similar peat extraction areas and industry in the wider landscape area, as well as the proposal to develop a wind farm project at the Application Site.

12.6.1 Cumulative Landscape and Visual Effects of Extraction Activity at the Application Site: 1948-1987 and Cumulative Interaction with the Extraction Phase (1988-2022)

As discussed throughout this Chapter, the greatest landscape and visual effects at the Application Site occurred prior to the baseline in 1988, therefore before the Peat Extraction Phase. These landscape and visual effects occurred from 1948 when industrial peat extraction first started, up until 1988 which is the end of a period before the 1988 baseline and start of the Peat Extraction Phase which is under assessment in this rEIAR. This section discusses cumulative landscape and visual effects and interactions which would have occurred across the two time periods (1948–1987) versus the Peat

Extraction Phase (1988-2020). The focus of the discussion below is the extent to which negative landscape and visual effects occurring in the Peat Extraction Phase contribute to effects prior to the 1988 baseline.

Cumulative Landscape and Visual Effects of Pre-1988 Extraction Areas: Ballivor, Carranstown, Bracklin & Lisclogher Bogs

As reported previously in Section 12.5.2 in relation to Ballivor Bog, the western portion of Carranstown Bog, Bracklin Bog & Lisclogher Bog, the removal of peat throughout the Peat Extraction Phase changed the physical fabric of the landscape by removing material and altering the topographical profile of the landform year on year, resulting in negative direct landscape effects of 'Slight' significance. Therefore, there is a cumulative direct landscape effect with peat extraction occurring in these areas prior to the 1988 baseline.

With regards to landscape character, these areas of the Application Site (Ballivor Bog, the western portion of Carranstown Bog, Bracklin Bog and Lisclogher Bog) were already subject to peat extraction prior to 1988 and the character of the landscape had already been substantially altered. Therefore, activity in the Peat Extraction Phase in these areas do not contribute any negative effects on landscape character and do no contribute to cumulative effects on landscape character prior to the 1988 Baseline.

As reported previously in Section 12.5.2, the degree of visual change occurring on the areas already subjected to intensive peat extraction would be 'Negligible'. Also as established during the visibility appraisal, there is very limited visibility into the Application Site from sensitive visual receptors or any scenic amenity designations. Therefore, no significant visual effects are determined to have occurred at Ballivor Bog, the western portion of Carranstown Bog, Bracklin Bog & Lisclogher Bog during the Peat Extraction Phase. In this regard, these areas have no contribution to cumulative visual effects with the change to scenic amenity that occurred as a result of the initial extraction activity which occurred in these areas prior to the 1988 Baseline.

Lisclogher West Bog – Cumulative Effects with activity prior to the 1988 Baseline (period 1948-1987)

No peat extraction activity occurred in Lisclogher West Bog prior to the 1988 baseline. Therefore, no cumulative effects occur with activity occurring in that period.

North of Bracklin West Bog & Carranstown East Bog - Cumulative Effects with activity prior to the 1988 Baseline (period 1948-1987)

As reported previously in Section 12.5.2, 'Significant' landscape effects occurred in an area in the northwest of Bracklin Bog and the eastern portion of Carranstown Bog during the Peat Extraction Phase. In combination with the extraction occurring prior to the 1988 baseline, these cumulatively extend the spatial extent of landscape effects which historically occurred across the Application Site where large scale change to the physical fabric and character of the landscape occurred.

In mind of the 'Low' sensitivity of visual receptors and visual enclosure afforded to the north of Bracklin Bog the overall negative visual effects occurring in the Peat Extraction Phase were deemed to be of 'Slight' Significance. It is considered that these effects were highly localised. Therefore, the visual effects of activities in the north of Bracklin Bog do not have a significant contribution to cumulative effects occurring in combination with the visual effects which occurred at the Application Site prior to the 1988 Baseline.

As reported previously in Section 12.5.2, it was initially determined that a negative 'significant' visual impact was deemed to arise at the eastern portion of Carranstown Bog during the Peat Extraction Phase. However, on balance considering many factors limiting visibility from visual receptors, the assessments in this Chapter determined that residual visual effects upon scenic amenity arising from the

eastern portion of Carranstown Bog are of 'Moderate' significance. These visual effects specifically relate to views from local residents and a small portion of the R156 Regional Road. The effects have a moderate contribution to cumulative visual effects with the changes to scenic amenity which occurred prior to the 1988 baseline as they slightly extend the substantial changes to landscape views as seen from visual receptors in the public realm.

12.6.2 Peat Extraction Phase: Cumulative Interactions with other Peatland extraction and relevant industries in the wider landscape (Post-1988)

Other peatland landscapes within the midlands which have been subject to industrial scale peat extraction are existent in the wider landscape surrounding the Application Site. Peat extraction at the Application Site has contributed to a cumulative impact on the wider landscape and its character. However, it is key to note that changes to landscape character as a result of peat extraction activity during the Peat Extraction Phase has been minimal since the 1988 baseline. As reported previously, in this Chapter, the greatest landscape and visual effects happened prior to the 1988 baseline. The other cutover peatlands in the wider landscape are separated from the Application Site by substantial distances, as well as being buffered by physical landscape features such as roads, agricultural land, woodland, waterbodies and settlements. The additional effects on landscape character as a result of extraction at the Application Site (during the Peat Extraction Phase) is a very minor contribution to the overall cumulative effect on designated Landscape Character Areas.

As flat features of the landscape, peatlands of the Application Site are visually separated from other sites of industrial peat extraction in the wider landscape. There may be very minor cumulative landscape and visual effects in terms of in combination visual effects when viewing expansive cutover bogs from elevated vantage points with panoramic views. However as shown in the imagery from Slieve na Cailliagh (Figure 12-16 previously) it is unlikely that peatlands are easily to distinguish in the highly vegetated, flat landscape of the Irish midlands.

Sequential cumulative visual effects occur when a receptor will experience effects of multiple developments/projects by moving from one location to another. At a macro scale, effects during the Peat Extraction Phase have contributed to sequential cumulative visual effects which where a visual receptor travels across the landscape and experiences views of multiple cutover peatland landscapes, including the Application Site.

The Application Site is located in a rural area surrounded by agricultural lands, forestry and woodlands. While there are and have been various one-off houses and individual commercial facilities in the vicinity of the Application Site (please refer to Section 2.5 Cumulative Impact Assessment in Chapter 2), these are immaterial from a cumulative landscape and visual effects perspective given the scale of the peat extraction activities and duration of the Peat Extraction Phase under assessment. The landscape within which the Application Site is located is a working landscape consisting of agricultural fields, including pasture fields, field boundaries, and commercial forestry. The peat extraction activity in combination with these activities has had a cumulative landscape and visual effect, but these are not deemed to be significant.

Summary of Cumulative Landscape Effects in the Peat Extraction Phase

With regards to direct cumulative landscape effects on the physical fabric of the landscape, there is no physical connectivity or interaction between the Application Site and any other peatlands in the wider landscape setting. Therefore, there is no potential for direct cumulative landscape effects to occur during the Peat Extraction Phase. With regards to cumulative effects on landscape character and designated LCAs, it is clearly established in Section 12.5.2 and in the text above that there was very limited visual change to the character or visual aesthetic of the landscape at a macro scale for most of the Application Site during the Peat Extraction Phase since the 1988 baseline.

As reported previously there was change to the landscape character in localised areas of the Application Site such as at Lisclogher West Bog, the northwestern portion of Bracklin Bog, and in the eastern portion of Carranstown Bog. Considering the localised nature of these changes and landscape character and enclosure of these areas by above ground landscape features in the flat landscape, there is very limited potential for there to be cumulative effects on landscape character with other peatlands in the wider landscape setting.

Summary of Cumulative Visual Effects in the Peat Extraction Phase

As reported in Section 12.5.2, any visual effects that occurred in the Peat Extraction Phase are highly localised, with limited visibility into the Application Site from any sensitive visual receptors or scenic amenity designations. The degree of visual change on the majority of these peatlands (Ballivor Bog, Carranstown Bog, Bracklin Bog and Lisclogher Bog) had occurred prior to the 1988 baseline. Therefore, excepting Lisclogher West Bog, the northwest of Bracklin Bog and the east of Carranstown Bog, most of the extraction activity at the Application Site has had no imperceptible visual effects during the Peat Extraction Phase and therefore does not have any contribution to negative cumulative visual effects with and modified elements of the wider landscape.

Considering the visual enclosure and limited visibility of effects from receptors during extraction at Lisclogher West Bog, and northwest of Bracklin Bog views, these 'Slight' visual effects have a limited contribution to cumulative visual effects with other peatlands and modified elements of the wider landscape setting.

'Moderate' residual visual effects were deemed to arise from the extraction at the east of Carranstown Bog during the Peat Extraction Phase. Whilst these visual effects are highly localised to several local residential receptors and a small portion of the R156 Regional Road, they would have contributed to sequential cumulative visual effects arising from the industrial extraction of peatlands in the wider landscape setting as visual receptors travels across the midlands of Ireland.

12.6.3 Current Phase: Cumulative Interactions

As reported previously in Section 12.5.3, no negative landscape and visual effects will occur in this phase, therefore there is no potential for cumulative landscape and visual effects with other peatland extraction or developments in the wider area.

12.6.4 Remedial Phase: Cumulative Interactions with other planned development

As reported previously in Section 12.5.4, no negative landscape and visual effects are likely to occur in this phase, therefore there is no potential for cumulative landscape and visual effects with other peatland extraction or developments in the wider area. For the avoidance of doubt, potential landscape and visual effects in the remedial phase are considered and discussed below in combination with both the proposed Ballivor Wind Farm and the permitted Bracklyn Wind Farm.

12.6.4.1 Proposed Ballivor Wind Farm

As detailed in Section 4.10 in Chapter 4, Bord na Móna Powergen Ltd lodged a planning application to An Bord Pleanála (Ref. PA25M.316212) for a development consisting of 26 no. wind turbines and associated works at the Ballivor Bog Group, known as Ballivor Wind Farm (https://www.ballivorwindfarm.ie/). The proposed wind farm is located on Ballivor bog, Carranstown bog, Bracklin bog, Lisclogher bog and agricultural land adjacent to Bracklin bog. The likely significant landscape and visual effects of the proposed Ballivor Wind Farm proposal are comprehensively assessed and reported within the EIAR accompanying the submitted planning application. As reported previously in Section 12.5.4, the activities proposed as part of the Remedial Phase will cause positive

landscape and visual effects, therefore there will be no contribution to any negative cumulative landscape and visual effects which may or may not arise as a result of the proposed Ballivor Wind Farm.

12.6.4.2 Permitted Bracklin Wind Farm

The Bracklyn Wind Farm is a 9 no. turbine project permitted by the Board in July 2022 (Ref. PA25M.311565). This wind farm is located on forestry and agricultural land south of Lisclogher West Bog and north of Bracklin Bog. As reported previously in Section 12.5.4, the activities proposed as part of the Remedial Phase will cause positive landscape and visual effects, therefore there will be no contribution to any cumulative landscape and visual effects which may arise as a result of the Bracklyn Wind Farm.

12.7 Conclusion

This chapter has addressed the significance of landscape and visual effects occurring at the Application Site since the 1988 baseline. A vast majority of the Application Site was subject to peat extraction in 1988 and the greatest landscape and visual effects had already occurred prior to the 1988 baseline. No significant landscape and visual effects occurred in these areas during the Peat Extraction Phase.

The greatest landscape and visual effects during the Peat Extraction Phase occurred at the west of Bracklin Bog and east of Carranstown Bog where the lands were stripped, and industrial peat extraction occurred. These areas comprise approximately 10% of the Application Site and were areas of drained bog prior to 1988. Significant landscape effects occurred here where a substantial change occurred within the landscape; these drained peatlands of medium sensitivity transitioned to a landscape of bare cutover peat. Considering the absence of visibility of these peatlands from any high sensitivity visual receptors due to a high level of screening around the bogs, residual visual effects were deemed to be of Moderate significance.

Prior to 1988, Lisclogher West Bog included large areas of intact raised bog of high sensitivity. The installation of drainage was competed there during the peat extraction phase causing direct landscape effects of moderate significance. Due to the limited visibility of this bog from any sensitive receptors and the very slight visual change occurring as a result of the drainage activity, visual effects were deemed to be not significant.

Designated Landscape Character Areas were established in 2008 for Co. Westmeath and in 2007 for County Meath. By this time, large areas of the Application Site were not subject to peat extraction, with peat extraction was occurring in just a few selected areas of the Application Site (e.g. approx. 27% of the landcover of the Application Site in 2004). Therefore, no negative change occurred to the landscape character of either County Westmeath Landscape Character Area 3 – River Deel Lowlands or County Meath LCA 15 – South West Lowlands since their inception. Due to the limited visibility of the peat extraction activity beyond roads and residences in the immediate vicinity of the Application Site, which themselves were screened by bog boundary vegetation, no significant visual effects occurred from any scenic amenity designations or any other sensitive receptors existent in the wider landscape.

Some areas of the Application Site have not been subject to peat extraction for considerable time (e.g. peat extraction ceased in large areas of Bracklin bog by 2003, and in Lisclogher in 2003), and these areas show signs of revegetation. Peat extraction ceased at the Application Site in June 2020 which has further enabled the landscape of the entire Application Site to continue to re-vegetate. However, the landscape is still currently categorised as a degraded bare cutover peat site of low sensitivity.

On balance, landscape and visual effects during the Current Phase are deemed to be 'Not Significant'. The primary activity of the Remedial Phase is to rewet cutover peatland in order to re-establish a naturally functioning wetland and peatland ecosystem. With the full implementation of the Remedial Phase Cutaway Bog Decommissioning and Rehabilitation Plans, there will be a Slight Positive

landscape and visual impact when compared to the 1988 baseline. Very minor cumulative landscape and visual effects may arise as the works and activities required for implementation of the Remedial Phase are likely to occur within a similar timeline with the works required to construct the permitted Bracklyn wind farm (Planning Reference PA25M.311565) and if consented, the proposed Ballivor Wind Farm. (Ref. PA25M.316212).

13. ARCHAEOLOGY AND CULTURAL HERITAGE

13.1 Introduction

This section of the rEIAR assesses the potential direct and indirect effects of the peat extraction activities and all ancillary works at the Application Site on the surrounding archaeological, and cultural heritage landscape. The Application Site which is the subject of this Substitute Consent Application to An Bord Pleanála (the Board), in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended).

The assessment is based on both a desktop review of the available cultural heritage and archaeological data and a comprehensive programme of field walking of the Application Site. An assessment of potential effects, including the Peat Extraction Phase, the Current Phase and the Remedial Phase of the Project is included. Cumulative effects are also addressed.

13.1.1 Statement of Authority

This chapter of the rEIAR has been prepared by Annette Quinn with updates by Miriam Carroll of Tobar Archaeological Services Ltd. Miriam Carroll and Annette Quinn both graduated from University College Cork in 1998 with Masters degrees in Methods and Techniques in Irish Archaeology. Both are licensed by the Department of Housing, Local Government and Heritage to carry out excavations and are members of the Institute of Archaeologists of Ireland. Annette Quinn and Miriam Carroll have been working in the field of archaeology since 1994 and have undertaken numerous projects for both the private and public sectors including excavations, site assessments (EIAR) and surveys. Miriam Carroll is a director of Tobar Archaeological Services Ltd which has been in operation for over 20 years.

13.1.1.1 Limitations

- There is no photographic evidence available from 1988 to review the baseline conditions of the bogs on the ground. Aerial images from 1973 to 2020 included in Appendix 4-4 of this rEIAR. As detailed in Section 4.4.5 peat extraction maps for the years 1988, 1995, 2004 and 2020 are presented and illustrate peat extraction activities and all ancillary works activity over time.
- Peatland surveys at the Ballivor Bog Group commenced 2005 therefore resulting in a lack of information from 1988 to 2005.
- Limitations specifically relating to fieldwork are outlined in Section 13.2.3.1 below.

13.1.2 Location

The Application Site consists of five bogs located at the Westmeath-Meath County border including Ballivor Bog, Carranstown Bog, Bracklin Bog, Lisclogher Bog and Lisclogher West Bog (Ballivor Bog Group). Each of the bogs is described in detail in Chapter 4 of the rEIAR. The Application Site is located 2.5 km south-southeast of Delvin, 3.7km east of Raharney and 2.2km west of Ballivor Village. The Application Site topography today ranges between 86 m above ordnance datum (m AOD) at its highest point to approximately 69 m AOD at its lowest point. The Application Site measures approximately 9.27km in length from north to south, and approximately 7.0 kilometres from east to west, at its widest point. The Grid Reference co-ordinates for the approximate centre of the Application Site are E 263560, N257213. The main Application Site access points include a northern and southern

entrance off the R156 Regional Road into Carranstown Bog and Ballivor Bog, respectively. Access to the remaining bogs is possible through Carranstown Bog and via local roads off the N52, N51 and N4 such as the L4106, L4101. Please see Figure 1-1 for details.

13.1.3 Legislation

The chapter has been prepared in compliance with all relevant EIA legislation including Annex (IV) 4 of the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU, which outlines the items that should be included in an EIAR. This is further described in Chapter 4, Section 4.1.3.

13.1.3.1 Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930 to 2004 and relevant provisions of the Cultural Institutions Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act) which means that any interference to a monument is illegal under that Act. All registered monuments are included on the Record of Monuments and Places (RMP).

The Record of Monuments and Places (RMP) was established under Section 12 (1) of the National Monuments (Amendment) Act 1994 and consists of a list of known archaeological monuments and accompanying maps. The Record of Monuments and Places affords some protection to the monuments entered therein. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Environment, Heritage and Local Government) and shall not commence the work for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monument are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

The term 'national monument' as defined in Section 2 of the National Monuments Act 1930 means a monument *'the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'*. National monuments in State care include those which are in the ownership or guardianship of the Minister for Arts, Heritage and the Gaeltacht. Section 5 of the National Monuments Act (1930) allows owners of other national monuments to appoint the Minister for the Arts, Heritage and the Gaeltacht or the relevant local authority as guardian of such monuments, subject to their consent. This means in effect that while the property of such a monument remains vested in the owner, its maintenance and upkeep are the responsibility of the State. Some monuments are also protected by Preservation Orders and are also regarded as National Monuments. National Monuments also includes (but not so as to limit, extend or otherwise influence the construction of the foregoing general definition) every monument in Saorstát Éireann to which the Ancient Monuments Protection Act, 1882, applied immediately before the passing of this Act, and the said expression shall be construed as including, in addition to the monument itself, the site of the monument and the means of access thereto and also such portion of land adjoining such site as may be required to fence, cover in, or otherwise preserve from injury the monument or to preserve the amenities thereof.

Under the Heritage Act (1995) architectural heritage is defined to include *'all structures, buildings, traditional and designed, and groups of buildings including street-scapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their*

setting, attendant grounds, fixtures, fittings and contents...'. A heritage building is also defined to include *'any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political, social or religious history of the place where it is situated or of the country or generally'*.

13.1.3.1.1 Granada Convention

The Council of Europe, in Article 2 of the 1985 Convention for the Protection of the Architectural Heritage of Europe (Granada Convention), states that *'for the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member State will undertake to maintain inventories of that architectural heritage'*. The Granada Convention emphasises the importance of inventories in underpinning conservation policies.

The National Inventory of Architectural Heritage as established in 1990 to fulfil Ireland's obligations under the Granada Convention, through the maintenance of a central record, documenting and evaluating the architectural heritage of Ireland. Article 1 of the Granada Convention establishes the parameters of this work by defining 'architectural heritage' under three broad categories of Monument, Groups of Buildings, and Sites:

- Monument: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
- Group of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest, which are sufficiently coherent to form topographically definable units;
- Sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogenous to be topographically definable, and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

The Council of Europe's definition of architectural heritage allows for the inclusion of structures, groups of structures and sites which are considered to be of significance in their own right, or which are of significance in their local context and environment. The National Inventory of Architectural Heritage (NIAH) believes it is important to consider the architectural heritage as encompassing a wide variety of structures and sites as diverse as post boxes, grand country houses, mill complexes and vernacular farmhouses.

13.1.4 County Development Plans

Specific policies regarding sites containing archaeological remains as well as built heritage structures detailed in the Development Plans for County Meath (2007 onwards) and Westmeath (2002 onwards), can be found in Appendix 13-5. Section 2.3.4 in Chapter 2 of this rEIAR also provides a summary of historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan form 1993.

13.1.5 Project Description

This chapter reports the findings of an assessment of any likely significant effects on Cultural Heritage which may have occurred or are occurring as a result of Bord na Móna's peat extraction works and ancillary activities at Ballivor, Bracklin, Carranstown, Lisclogher and Lisclogher West bogs (the 'Application Site') during the three Project phases since 1988. Chapter 4 (Description of the Development) provides a full description of the elements of the Project and are the baseline as of July 1988, the activities from July 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020, and the activities relating to historic peat extraction intended to be carried out into the future. As reported in Chapter 4, the assessments in this rEIAR address the

environmental impacts of peat extraction activities and all ancillary works occurring at the Application Site. The assessments in this chapter will determine the any likely significant effects that occurred on Cultural Heritage (or are likely to occur) during three differing timeframes termed 'phases' (as described in Chapter 4):

- **Peat Extraction Phase:** The likely significant effects on cultural heritage which may have occurred between July 1988 and June 2020;
- **Current Phase:** The likely significant effects on cultural heritage which may have occurred since the termination of peat extraction in June 2020 to present; and,
- **Remedial Phase:** The likely significant effects on cultural heritage that are likely to occur during future plans to restore the Application Site.

13.2 Methodology

The assessment of the archaeology, architecture and cultural heritage of the Application Site included Geographical Information Systems (GIS) mapping and desk-based research followed by field inspection. A desk-based study of the Application Site was initially undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify constraints or features of archaeological/cultural heritage significance within the Application Site.

13.2.1 Geographical Information Systems

GIS are a computer database which captures, stores, analyses, manages and presents data that is linked to location. GIS includes mapping software and its application with remote sensing, land surveying, aerial photography, mathematics, photogrammetry, geography and tools that can be implemented with GIS software. GIS was used to manage the datasets relevant to the archaeological and architectural heritage assessment and for the creation of all the maps in this section of the report. This involved the overlaying of the relevant archaeological and architectural datasets on georeferenced aerial photographs and road maps (ESRI), where available. The integration of this spatial information allows for the accurate measurement of distances of a development from archaeological and cultural heritage sites and the extraction of information on 'monument types' from the datasets. Areas of archaeological or architectural sensitivity may then be highlighted in order to mitigate the potential negative effects of a development on archaeological, architectural and cultural heritage.

13.2.2 Desktop Assessment

The below sources were consulted as part of the desktop assessment for the Application Site and are discussed in the following sections.

- The Record of Monuments and Places (RMP)
- The Sites and Monuments Record (SMR)
- National Monuments in State Care Counties Meath and Westmeath
- The Topographical Files of the National Museum of Ireland
- First edition Ordnance Survey maps (Tailte Eireann)
- Second edition Ordnance Survey maps (Tailte Eireann)
- Third edition Ordnance Survey Map (Record of Monuments and Places)
- Down Survey maps (www.downsurvey.tcd.ie)
- Aerial photographs (copyright of Tailte Eireann)
- Excavations Database
- National Inventory of Architectural Heritage (NIAH)
- Record of Protected Structures (Meath and Westmeath County Development Plans)
- Previous archaeological surveys and assessments carried out on or near to Application Site (various)
- Archaeological inventory of County Meath and Westmeath

13.2.2.1 Record of Monuments & Places, Sites & Monuments Record and National Monuments

A primary cartographic source which also provided baseline data for the assessment was the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for Counties Meath and Westmeath. All known recorded archaeological monuments are indicated on 6-inch Ordnance Survey (OS) maps and are listed in these records. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP the electronic database of recorded monuments and SMRs which may be accessed at www.heritagedata.maps.arcgis.com.

A review of all National Monuments in State Care and those subject to Preservation Orders was undertaken as part of the assessment in order to ascertain any potential effects on their setting as a result of the peat extraction activities and all ancillary works.

13.2.2.2 Cartographic Sources and Aerial Photography

The 1st (1840s) and 2nd (1900s) edition OS maps for the Application Site were consulted, where available, as was Tailte Eireann aerial photography.

13.2.2.3 Topographical Files - National Museum of Ireland

Details relating to finds of archaeological material and monuments in numerous townlands in the country are contained in the topographical files held in the National Museum of Ireland. In order to establish if any new or previously unrecorded finds had been recovered from the Application Site, these files were consulted for every townland within and adjacent to the same. The bogs database, also held in the National Museum of Ireland was also consulted for finds or items recovered from the Application Site.

13.2.2.4 Archaeological Inventory Series

Further information on archaeological sites may be obtained in the published County Archaeological Inventory series prepared by the Department of Housing, Local Government and Heritage. The archaeological inventories present summarised information on sites listed in the SMR/RMP and include detail such as the size and location of particular monuments as well as any associated folklore or local information pertaining to each site. The inventories, however, do not account for all sites or items of cultural heritage interest which are undiscovered at the time of their publication. Many sites have been discovered since the publication of the Inventory Series which have now been added to the Sites and Monuments Record.

13.2.2.5 Record of Protected Structures

The Record of Protected Structures for Counties Meath and Westmeath was consulted for the schedule of buildings and items of cultural, historical or archaeological interest. The county development plans also outline policies and objectives relating to the protection of the archaeological, historical and architectural heritage landscape of both Counties. The digital dataset for Protected Structures was downloaded from ArcGIS online and added to the project GIS mapping (Section 13.2.1 above) used for the creation of Figures in this chapter.

13.2.2.6 Excavations Database

The Excavations Database is an annual account of all excavations carried out under excavation license. The database is available online at www.excavations.ie and includes excavations from 1985 to 2024.

This database was consulted as part of the desktop research for this assessment to establish if any archaeological excavations had been carried out within or near to the Application Site.

13.2.2.7 National Inventory of Architectural Heritage (NIAH)

This source lists some of the architecturally significant buildings and items of cultural heritage and is compiled on a county-by-county basis by the Department of Housing, Local Government and Heritage. The NIAH database was consulted for all townlands within and adjacent to the Application Site. The NIAH survey for Offaly has been published and was downloaded on to the base mapping for the Application Site (www.buildingsofireland.ie). The NIAH is a state initiative under the administration of the Department of Housing, Local Government and Heritage and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999.

The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS). The published surveys are a source of information on the selected structures for relevant planning authorities. They are also a research and educational resource. It is hoped that the work of the NIAH will increase public awareness and appreciation of Ireland's architectural heritage.

13.2.2.8 Previous Surveys and Assessments

A number of archaeological surveys were previously carried out within the Application Site during the lifetime of peat extraction activities and all ancillary works by Bord na Móna (the Applicant). A summary of the available results of such surveys and/or any reassessment surveys is presented below. These are discussed in Section 13.4.2 below.

13.2.2.9 Scoping & Consultation

Regarding archaeological heritage, the scoping response from the Department of Housing, Local Government and Heritage:

The applicant is required to engage the services of a suitably qualified archaeologist to carry out an archaeological impact assessment of the development site. No sub-surface work should be undertaken until an archaeological assessment has been completed and commented on by this office. The archaeologist should carry out any relevant documentary research and inspect the development site. The ground impacts of the development on the Recorded Monument shall be assessed and described in detail. Having completed the work, the archaeologist should submit a written report stating their recommendations to the National Monuments Service. Where archaeological material/features are shown to be present, preservation in situ, preservation by record (excavation) or monitoring may be required.

Further detail on scoping is provided in Section in Section 2.6 in Chapter 2 of the rEIAR.

13.2.3 Field Inspection

A walkover survey of all areas within the Application Site was undertaken over a number of days in May, June, July and September 2021. The inspection was undertaken by Miriam Carroll, Annette Quinn and Paul Fingleton. The inspection consisted of a walk-over examination of the bog. A full photographic record of the Application Site was made and is described below in Section 13.3.

Furthermore, 98 site investigation trial pits were archaeologically monitored under excavation licence 20E0224 from the National Monuments Service within an area of predominantly cut over bog, some parts of which are colonised with vegetation. These site investigations were undertaken as part of the proposed Ballivor Wind Farm planning application, as detailed in Section 4.10.1 in Chapter 4. Where such vegetation was present it largely took the form of heather and grasses, however, some areas were also under tree cover. A number of trial pits were excavated in green areas to the south of Bracklin Bog and some on top of gravel ridges. The stratigraphy noted within the trial pits varied throughout the Application Site but typically consisted of an upper layer of loose, soft rooty peat or milled peat overlying layers of fibrous peat. The underlying natural subsoil comprised a grey / blue silt or gravelly silt. In some areas only shallow peat cover was apparent where the pits were located on esker gravel ridges. No archaeological features were identified.

13.2.3.1 Limitations Associated with Fieldwork

Where dense vegetation was present, this limited the ability to inspect the field surface for any potential features that may exist on the surface. The monitoring of the site investigation trial pits as detailed above provided an opportunity to assess many areas within the Application Site for the presence of any sub-surface features. Inspection of all drains was carried out aside from those that were flooded or overgrown. No archaeological features were recorded during the site investigations.

13.2.4 Assessment of Likely Significant Effects

The likely effects on the existing archaeological, architectural and cultural heritage environment are assessed using the criteria as set out in the draft *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2022) and as outlined in Section 1.7.2 of Chapter 1. The following terminology is used when describing the likely effects of the extraction industry from a Cultural Heritage perspective.

13.2.4.1 Types of Effect

- Direct effects arise where an archaeological heritage feature or site is physically located within the footprint of the development whereby the removal of part, or all of the feature or site is thus required.
- Indirect effects may arise as a result of subsurface works undertaken outside the footprint of the development, secondary environmental change such as a reduction in water levels and visual effects.
- Cumulative effects arise when the addition of many effects create a larger, more significant effect.
- Residual effects are the degree of environmental changes that will occur after the proposed mitigation measures have been implemented.

13.2.4.1.1 *Magnitude of Effects (Significance)*

- Profound: Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed.
- Very Significant: An effect which by its character, magnitude, duration or intensity significantly alters most of the sensitive aspect of the environment.
- Significant: An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. An effect like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological site.
- Moderate: A moderate effect arises where a change to an archaeological site is proposed which though noticeable, is not such that the integrity of the site is compromised, and which is reversible. This arises where an archaeological site can

be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
- Slight: An effect which causes changes in the character of the environment which are not high or very high and do not directly impact or affect an archaeological site.
- Not Significant: An effect which causes noticeable changes in the character of the environment but without significant consequences.
- Imperceptible: An effect on an archaeological site capable of measurement but without noticeable consequences.

13.2.5 Methodology for the assessment of effects on visual setting (indirect effects)

A standardised approach is utilised for the assessment of effects of visual setting (indirect effects) according to types of monuments and cultural heritage assets which may have varying degrees of sensitivity. This assessment takes into consideration peat extraction activities and all ancillary works which would not have had an effect on the visual setting of monuments. Only direct effects were likely and therefore considered in the assessment. Since peat extraction activities (clearance of vegetation, drainage, peat extraction activities and all ancillary works) were confined to the surface of the peat and sub-surface, this activity type is not considered to be capable of having wider landscape negative effects on setting on cultural heritage (i.e. indirect effects).

13.3 Establishing the 1988 Baseline

Section 4.4.1 in Chapter 4 provides a detailed description of the baseline environment as July 1988. For purposes of clarity, a short summary description is also provided here.

By 1988, the landuse at the Application Site was well established as industrial peat extraction activities and all ancillary works. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in place. The main entrance points to the Application Site were located north and south off the Ballivor-Raharney (R156) road, and the machine pass/rail crossings between Brackiln and Lisclogher bog. The Ballivor Works (the Works), which comprised a peat processing plant, canteen, storage sheds, and maintenance buildings, was located in the north of Ballivor Bog, where it is still located in present day. The following ancillary infrastructure was established at the site by 3rd July 1988:

- Railway infrastructure (all bogs within the Application Site except Lisclogher West);
- Internal machine passes/tracks (all bogs within the Application Site except Lisclogher West);
- Bulk Loading Facility at the Works of R156 in Ballivor Bog (Planning Grant 1983);
- Workshop and extension at the Works of R156 in Ballivor Bog (Planning Grant 1977);
- Covered Loading Bay at the Works off R156 in Ballivor Bog (Planning Grant 1972);
- Silt ponds and drains (all bogs (apart from Lisclogher West) within the Application Site); and,
- Two pumps at Ballivor Bog and one pump at Lisclogher Bog (Decommissioned by 2000).

13.3.1 Ballivor Bog

13.3.1.1 1988 Baseline

Satellite imagery and annual reports indicate that by 1988, approximately 473ha of Ballivor Bog was undergoing sod and milled peat extraction. The associated drainage and rail infrastructure required for

this activity was in situ. Thus, the main landcover type was cutover peat. Several areas of remnant uncut raised bog (approx. 165 hectares) remained intact, predominantly around the edges of the bog.

13.3.1.2 Current Environment

Aerial photographs from 1995 indicate that Ballivor Bog was still undergoing sod and milled peat extraction. The east, northeast and south of the bog was undergoing milled peat extraction while part of the centre was undergoing sod peat extraction. By 2000, the western portion of the bog was no longer subject to peat extraction activities and all ancillary works. The remaining areas of the bog remained subject to peat extraction activities and all ancillary works until 2020, and these areas are dominated largely by bare peat.



Plate 1: Example of revegetated area along the southern limits of Ballivor Bog. Photo taken 2021



Plate 2: Revegetated section of Ballivor Bog at southern limits (Photo taken during Site investigations on 19th July 2021).



Plate 3: View looking northwest over Ballivor Bog taken from the south-eastern boundary. Photo taken 2021



Plate 4: Section of narrow gauge railway within southern section of Ballivor Bog. Photo taken 2021



Plate 5: Southern section of Ballivor Bog revegetated looking east. Photo taken 2021



Plate 6: Bare milled peat in Ballivor Bog looking south-east. Photo taken 2021



Plate 7: Bare milled peat in Ballivor Bog with partially revegetated drains looking north-west. Photo taken 2021



Plate 8: Northern section of Ballivor Bog looking west. Photo taken 2021



Plate 9: Entrance into Ballivor Bog looking south Photo taken 2021

13.3.2 Carranstown Bog

13.3.2.1 1988 Baseline

Aerial imagery from 1988 indicates that drainage was in place and extraction of milled peat was underway on approximately 80 hectares in the western portion of Carranstown Bog. Carranstown Bog was linked to Ballivor Bog to the south and Bracklin Bog to the north via railway infrastructure. The western portion under drainage and extraction included 5 no. silt ponds, and 4 no. surface water emission points.

13.3.2.2 Current Environment

Today, the bog still retains a dome shape though much of the section was developed for milled peat extraction and a large proportion of the bog comprises bare peat due to continued extraction until 2020. Small areas to the east and west, which were initially developed for milled peat extraction but never fully subject to peat extraction have since revegetated with Birch and pine scrub and dense bracken covering significant areas presently.



Plate 10: Carranstown Bog (west of railway) looking north from southern boundary.



Plate 11: Carranstown Bog (west of railway) looking east along southern boundary.



Plate 12: Carranstown Bog (west of railway) towards the centre looking southern over gravel ridges. Photo taken 2021



Plate 13: Western section of Carranstown Bog looking East - revegetated. Photo taken 2021



Plate 14: Western section of Carranstown Bog looking south-west showing heather growth on bog surface. Photo taken 2021



Plate 15: North-western section of Carranstown Bog looking west at bare milled peat and where recolonised section begins. Photo taken 2021



Plate 16: Northern section of Carranstown Bog (west of railway) looking south. Railway on high bank to left. Photo taken 2021

13.3.3 Bracklin Bog

13.3.3.1 1988 Baseline

By 1988, peat extraction was underway across most of Bracklin Bog, (approx. 351 hectares). Areas of remnant uncut raised bog remained intact across Bracklin Bog (approx. 363 hectares), predominantly at the edges, with approximately 58ha of Bracklin West Bog drained but not yet subject to peat extraction. Drainage for was already installed, and railway infrastructure, which was laid throughout the 1950s and 1960s, connected Bracklin Bog to Carranstown Bog (to the south) and Lisclogher Bog (to the north). Bracklin Bog included 6 no. artificial silt ponds, and 5 no. surface water emission points which remain *insitu* today. The main access point to Bracklin Bog was off a local road at the northeast of the bog or internally from the south through Carranstown Bog.

13.3.3.2 Current Environment



Plate 17: Bracklin Bog looking north from southern boundary. Photo 2021



Plate 18: Track through Bracklin Bog looking north with revegetated sections to east and west (Tonduff to right). Photo 2021



Plate 19: Railway through Bracklin Bog looking north Photo 2021



Plate 20: Eastern section of Bracklin Bog looking West from eastern boundary near Hill of Down Railway. Photo 2021



Plate 21: Northern section of Bracklin Bog looking East showing revegetation and dense tree cover.



Plate 22: Western section of Bracklin Bog to east of railway looking East over re-vegetated bog



Plate 23: Section of Bracklin Bog under milled peat production at western side.



Plate 24: Small area of revegetated and overgrown section of Bracklin Bog to north of area in milled peat production looking south.



Plate 25: Bracklin Bog area in peat production looking southwest.



Plate 26: Entrance into Hill of Down Rail section of bog adjacent to Bracklin Bog, looking west from public road.

13.3.4 Lisclogher Bog

13.3.4.1 1988 Baseline

By 1988, the centre of the bog has been drained and sod peat extraction was underway. The extremities of the bog (approximately 101 ha) were not under extraction and comprised mainly raised bog with raised bog features such as high bog, wet flush areas, and bog woodland. A section of Birch woodland was located at the southern end of the bog, located in a small valley between two sections of raised bog. A stream flowed through the woodland at the bottom of the valley. Species present included Birch, large mature Oak, mature Scots Pine, Rowan, and Holly. These habitats remain today. Railway infrastructure was *in situ*, connecting the bog to Bracklin Bog to the west, across a local road.

13.3.4.2 Current Environment



Plate 27: Southern section of Lisclogher Bog looking East



Plate 28: Southern section of Lisclogher Bog looking South-west.



Plate 29: North-eastern corner of Lisclogher Bog looking West.



Plate 30: Area in northern section of Lisclogher Bog, just to west of railway looking south-west.

13.3.5 Lisclogher -West

13.3.5.1 1988 Baseline

Drainage infrastructure was partially installed in Lisclogher West Bog by1988. Lisclogher West Bog was never subject to peat extraction. An area of 106ha of Lisclogher West Bog was never subject to drainage or peat extraction and therefore, the landcover in 1988 comprised mainly natural raised bog with raised bog features such as high bog, wet flush areas and bog woodland particularly at the bog borders. The bog includes 6 no. silt ponds and 2 no. surface water emission points. The topography of the bog today ranges from 77 - 82mOD. As the bog was never subject to peat extraction, it is assumed that the existing topography is representative of the topography in 1988.

13.3.5.2 Current Environment



Plate 31: Eastern Boundary of Lisclogher West Bog looking west.



Plate 32: Western side of Lisclogher West Bog.

13.3.6 Archaeological Heritage of the Application Site

Archaeological Heritage includes World Heritage Sites, National Monuments, sites which are subject to a preservation order, sites listed in the RMP/SMR and newly discovered archaeological sites as well as previous finds within the bog (recorded in the Bogs and Topographical files of the National Museum). Each of these are addressed in the following sections. UNESCO World Heritage sites and National Monuments in State ownership in the wider landscape setting were not affected by the peat extraction activities and all ancillary works at the Application Site under assessment in this report and therefore are scoped out of the assessment as peat extraction activities and all ancillary works within the Application Site of bogs are not capable of affecting sites which are located numerous kilometres from the working bogs.

13.3.7 Recorded Monuments within the Application Site boundary

No recorded monuments are located within the Application Site boundary.

13.3.8 Archaeological Investigations

The Application Site incorporates Ballivor, Carranstown, Lisclogher, Lisclogher West and Bracklin bogs. A number of archaeological surveys were previously carried out within these bogs during the lifetime of peat extraction activities and all ancillary works within same by the Applicant. A summary of the available results of such surveys and/or any reassessment surveys is presented below.

13.3.8.1 Ballivor Bog

Previous Surveys

Partial human remains consisting of a torso, head and upper arms were recovered at the Works on 21st February 2003. In accordance with the report on the human remains (**Appendix 13-2**) Corcoran 2003, 1), the remains were disturbed both during the peat extraction process and later during the stockpile removal process. The milled peat was removed from the stockpile into the rail carriages by a mechanical excavator. The stockpiled material was then transferred to a storage shed at the Works area (adjacent to Application Site) where it then passed through a conveyor belt to extract larger organic waste material (tramp material). The human remains were discovered at this stage of the process. The Applicant was able to identify the location of the stockpile that was being screened. This was in the townland of Clonycavan approximately 1.5km southeast of the Applicant's offices at the Works. The area was inspected and systematically walked by Jane Whitaker and Moira O'Rourke of ADS Ltd and Ann Lynch of the DOEHLG during a field visit on the 28th February 2003. On the 12th August 2003 a team of one supervisor, one site assistant and two archaeologists under the direction of Eoin Corcoran, ADS Ltd (Licence Ref.: 03E1221) investigated the find spot by shovel scraping, sweeping and trowelling a 100m long area. No further remains were recovered.

Ballivor Bog was one of 15 bogs selected for archaeological survey in 2005 as part of the Archaeological Survey of Ireland Peatland Survey. The bog was field walked by ADS Ltd at two drain intervals with the exception of the cutaway part of Ballivor, which was walked at roughly 30m intervals as there were no drains to follow. **No archaeological features were recorded during this survey.**

Townlands and Topographical Files of the National Museum

The townlands within Ballivor Bog include Robinstown, Clonycavan, Derryconnor, Clondalee More, Riverdale and Grange More.

There are ten stray finds recorded in the topographical files of the NMI from the general area of Ballivor Bog. These finds include the 2003 discovery of a partial bog body from Clonycavan townland ('Clonycavan Man') (see above).

Also, from Clonycavan, were a brass dish or cauldron (1949:1) and a leather shoe (IA/29/1994). There were two finds from Grange More; a leather shoe (1934) and a stone axehead (W.216; A.537), an ecclesiastical bell of iron dipped in bronze (1928:640), a bronze sword (1963:5) from Clondalee More and a stone axe (1828:17) and bronze spearhead (1941:349) from Riverdale.

Effects of past peat extraction activities and all ancillary works are addressed in Section 13.4.2.4.



Figure 13-1: Find spot of Clonycavan Man within Ballivor Bog.

13.3.8.2 Carranstown Bog

Carranstown Bog is located immediately north of the R156 that runs from Raharney to Ballivor. An unclassified road runs northwards along its western extent while the eastern margins are forested. To the north there are some private turbary plots leading to farmland further northwards. The main access

is from the level crossing on the R156 where the rail line crosses into Ballivor Bog. Peat extraction was ongoing in 2018 when last visited by Irish Archaeological Consultancy (IAC) during the Cultural Heritage Assessment of the Derrygreenagh Bog Group (IPC Licence: P0501-01), Whitaker (2014) and Jacqui Anderson (2018). There is a rail line that runs north-south from the level crossing through the centre of the bog.

Carranstown Bog was one of 15 bogs selected for archaeological survey in 2005 as part of the Archaeological Survey of Ireland Peatland Survey (Whitaker 2005). The bog was field walked by ADS Ltd at two drain intervals with the exception of the overgrown area which was walked at roughly 30m intervals. **No archaeological features were recorded during this survey.**

Townlands and Topographical Files of the National Museum

Carranstown Bog includes the townlands of Carranstown Little, Carranstown Great, Killaconnigan, and Grange More.

No stray finds were recovered from the aforementioned townlands.

13.3.8.3 Bracklin Bog

Bracklin Bog is located north of Carranstown Bog between three unclassified roads. The road from Raharney to Delvin runs along its western extent while two smaller roads that run eastwards from this road define its northern and southern extents. The remainder is overgrown sod peat bog that has become forested in places. There is an industrial railway that runs along the eastern side of this bog. The westernmost part of the bog, Bracklin West, was subject to peat extraction until June 2020.

Townlands and Topographical Files of the National Museum

Bracklin Bog includes the townlands of Bracklin, Craddanstown, Killagh, Mucklin and Ballynaskeagh.

Stray finds of bog butter, hair, textile and leather are recorded from Coolronan townland (IA/186/1952) found rolled together in a ball at a depth of 7-12ft in a bog. Bracklin townland spans both Bracklin and Lisclogher bogs, the exact find spot of the four finds attributed to this townland is therefore uncertain. These finds are: a wooden lid (1964:83), a bronze sword blade (1959:31), a Neolithic pottery vessel (1959:09) and a polished stone axehead (1962.243).

13.3.8.4 Lisclogher Bog

Lisclogher Bog is at the northernmost extent of the Application Site. The bog is split into two separate bogs by an unclassified road that runs northeast-southwest to Ballyhealy crossroads. The eastern part of the bog has a small amount of forestry along the northern and eastern extent of the bog and private turbury along the southern extent. The main access is from the unclassified road that splits the two parts of the bog. The area west of this road is referred to as Lisclogher West Bog and is discussed below. The eastern part of the bog, referred to as Lisclogher Bog, was originally subject to sod peat extraction and had not been converted to milled peat extraction. There are several high face banks with the remainder of the bog at a lower undrained level.

Lisclogher Bog was one of 15 bogs selected for archaeological survey in 2005 as part of the Archaeological Survey of Ireland Peatland Survey (Whitaker 2005). The bog was field walked by ADS Ltd at roughly 30m intervals as there were no field drains. **No archaeological features were recorded during this survey.**

Townlands and Topographical Files of the National Museum

Lisclogher Bog includes the townlands of Coolronan, Lisclogher Great, Cockstown, Clonmorrill, Clonleame and Bracklin.

A bronze axehead (1954:54) found 10ft deep in the bog and 14 pieces of wood (IA/104/1982) are recorded from the townland of Lisclogher in the topographical files of the National Museum. It is not certain if these are from the Applicant's peat extraction area or from private turbary plots.

13.3.8.5 Lisclogher West Bog

Lisclogher Bog was one of 15 bogs selected for archaeological survey in 2005 as part of the Archaeological Survey of Ireland Peatland Survey (Whitaker 2005). The bog was field walked by ADS Ltd. As it was covered in extensive scrub and overgrowth making visibility poor and field walking very difficult. **No archaeological features were recorded during this survey.**

13.3.8.6 Potential Subsurface Archaeology

While no archaeological monuments were recorded during the 2005 Peatland Survey, the discovery of the human remains in 2003 ('Clonycavan Man') along with the recorded stray finds from the area and the recorded monuments in the dryland surrounding the bog, suggests that there is a high potential for archaeological finds and features within the peat. Effects and mitigation measures are addressed in Section 13.4.

13.3.9 Townlands and administrative boundaries

Townlands and administrative boundaries may indicate the presence of archaeological features within a development site. Administrative counties are subdivisions of pre-established counties which were formed for administrative purposes in the nineteenth and twentieth centuries. Baronies are administrative units larger than civil parishes and originally established as the primary subdivision of counties by the British administration in Ireland. Irish baronies which were formed at the time of the Norman conquest were usually named either after Irish territories, or from places which had been of importance in pre-Norman times. Irish baronies came into existence at different periods. The division of Ireland into counties and baronies was a process which continued down to the reign of James I. The original baronies in Ireland were the domains of the Norman barons; in the final stage of development, they were divisions of counties created merely for greater convenience of administration. The word barony is of feudal origin, and was applied to a tenure of a baron, that is, of one who held his land by military service, either directly from the king, or from a superior feudal lord who exercised royal privileges. The origin of the Irish barony (a division of land corresponding to the English hundred) is to be found in the grants of lands which were made to the barons of Leinster and the barons of Meath (Liam Price, 'Ráith Oinn', Éigse VII, lch. 186-7). Civil parishes are administrative units larger than townlands and based on medieval ecclesiastical parishes. Civil parishes, modern Catholic parishes and Church of Ireland parishes may differ in extent and in nomenclature. Counties are administrative units larger than baronies and originally established by the British administration in Ireland between the twelfth and the seventeenth centuries. Some of these were subsequently subdivided into smaller administrative county units.

Townlands are the smallest land units which were determined and established in the Irish administrative system in the first half of the nineteenth century. Many of the townlands were in existence prior to that. Townland names are a valuable source of information, not only on the topography, land ownership and land use within the landscape, but also on its history, archaeological monuments and folklore. Logainm.ie was utilised to ascertain the origin of the townland names.

Table 13.1: Townlands in the vicinity and within the Application Site

Townland Name	Meaning	Logainm ID	County	Meaning
Clonycavan	Cluain Uí Chaomháin	39086	Meath	meadow, pasture
Carranstown Little	Baile Chearráin Beag	39085	Meath	townland, town, homestead beag(also: big) small
Killaconnigan	Cill Chonagáin	39091	Meath	cill church
Carranstown Great	Baile Chearráin Mór	39084	Meath	baile townland, town, homestead mór great, big
Clondalee More		39111	Meath	Not Known
Derryconor	Doire Chonchúir	39099	Meath	doire (oak-)wood, grove, thicket
Robinstown	Baile Roibín	39096	Meath	baile townland, town, homestead
Coolronan	Cúil Rónáin	38969	Meath	cúil corner, nook
Riverdale	Abhainn na Daoile	51430	Westmeath	abhainn(also: abha) river
Craddanstown		51272	Westmeath	Irish name to be confirmed
Bracklin	Breaclainn	51278	Westmeath	speckled place; speckled pasture
Mucklin		51271	Westmeath	Not Known
Grange More		51428	Westmeath	Irish name to be confirmed
Clonmorrill		51301	Westmeath	Not Known
Cockstown		51302	Westmeath	Not Known
Lisclogher Great	Lios Clochair	51303	Westmeath	clochar(also: cloichear) stony place lios ring-fort, enclosure

Clonleame		51267	Westmeath	Not Known
Ballynacor		51277	Westmeath	Not Known
Killagh		51270	Westmeath	Not Known
Ballynaskeagh	Baile na Sceach	51269	Westmeath	baile townland, town, homestead sceach(also: sceich) hawthorn, thorn-bush
Ballyhealy Or Ballinure	Baile Uí Áille	51263	Westmeath	baile townland, town, homestead

13.3.10 Topographical Museum Files

The National Museum provided historical information on stray finds within their Bogs Databases. Stray finds from the Application Site are included in Section 13.3.8 above.

13.3.11 Cartographic Evidence

13.3.11.1 1st and 2nd Edition OS maps

The Ordnance Survey came to Ireland in 1824 in order to carry-out a precise admeasurement of the country's 60,000 or so townlands as a preliminary to the larger task of reforming Ireland's local taxation system. The townland boundaries were demarcated by a Boundary Commission, and the Ordnance Survey had the task of measuring them. In addition to boundaries the maps are truly topographical in content. Drawn at the large scale of six inches-to-one-mile (1:10,560) it was important to mark all buildings, roads, streams, placenames, etc, that were required for valuation purposes. Ultimately the maps were used as a basis for the rateable valuation of land and buildings in what became known as Griffith's Valuation. Working from north to south, the survey began in Antrim and Derry in 1829 and was completed in Kerry in 1842. It was published as thirty-two county maps between 1832 and 1846, the number of sheets per county varied from 153 for County Cork to 28 for Dublin, each of the 1,994 sheets in the series depicting an area 21,000 by 32,000 feet on the ground. Each county was projected on a different central meridian and so the maps of adjacent counties do not fit neatly together at the edges. Map content stops at the county lines.

The First Edition

The early Ordnance Survey maps are an unrivalled source for the period immediately before the Great Irish Famine (1847-50) when the population was at the highest level ever recorded. The maps depict an open landscape in the majority of the bog. A possible famine settlement is shown in Bracklin Bog on both the 1st Edition 6 inch map and the 25 inch 2nd Edition. The settlement is named Tonduff.



Figure 13-2: Location of famine settlements in Bracklin Bog.

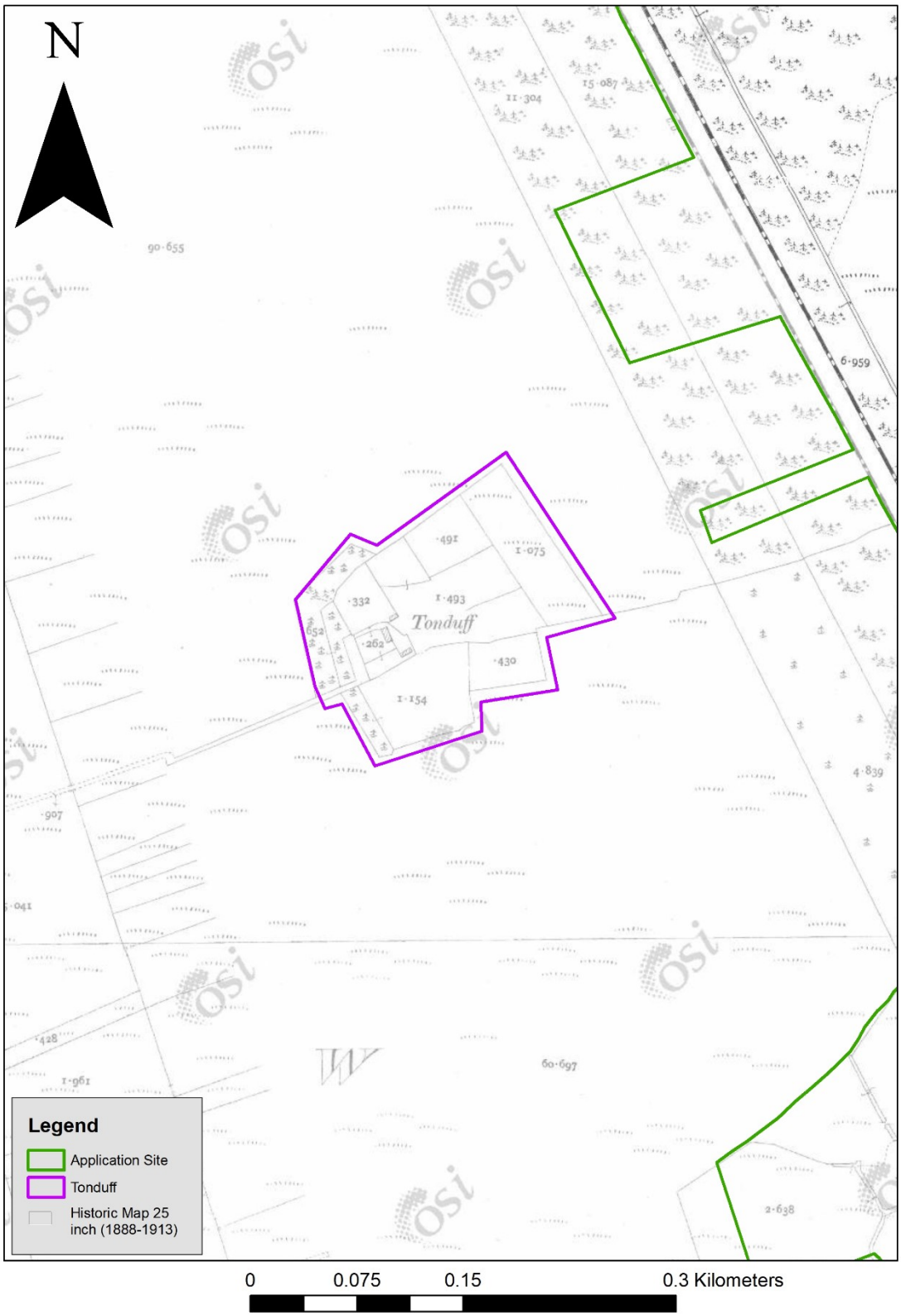


Figure 13-3: Detail of famine settlements on 25inch Historic OS.



Plate 13-33: Original entrance to Tonduff Settlement looking East.



Plate 13-34: Remains of famine house looking south – area too overgrown to measure.

13.3.12 Architectural Heritage

13.3.13 Protected Structures & the National Inventory of Architectural Heritage

One structure listed in the Record of Protected Structures (RPS) is located within the Application Site boundary. This consists of the RPS 021-008 permanent narrow gauge Bord na Móna railway line. The centre point for this structure is located to the northeast of the Works adjacent to the Application Site boundary, north of Ballivor Bog. It is described in the National Inventory of Architectural Heritage (NIAH) (Reg. No. 15402102) as follows:

'*Description: Permanent narrow gauge Bord na Mona railway line, erected c.1952, for transporting turf to the Ballivor Processing Plant, Co Meath. Now only used to transport carriages brought in for servicing. Constructed of steel I beams. Railway line is three foot wide and is laid in ten yard sections. Level crossing to main road comprises concrete piers with steel cross bars. Much of the earlier permanent narrow gauge is overgrown by vegetation. Located to the east of Raharney, close to the border with County Meath.*

Appraisal: Board na Mona narrow gauge railways and ancillary structures are an important element of the twentieth century industrial and economic heritage of Ireland. They are a common feature of the landscapes of the Bog of Allen, particularly in Co Westmeath, Co. Offaly, Co. Longford and Co. Kildare and are almost a type that is unique to the midlands of Ireland. They are important historical reminders of the attempts of the Irish Government(s) to create employment in the midlands and utilise peat as a natural resource on an industrial level in the mid twentieth-century and have a huge social and economic importance to the midlands as a result. The simple steel and concrete level gates complete this record and add incident to the bog landscape'.

The rail infrastructure is described in detail in Chapter 4 Section 4.2.3.6 and Section 4.5.5.1. In summary, peat extraction areas were served by a network of permanent narrow-gauge rail tracks, (approximately one metre in width and with track lengths of approximately 9 metres), the majority of which was constructed in the 1950s and 1960s. The Annual Report of 1951 indicates that Bracklin Bog was listed for development with expenditure earmarked for railway infrastructure as well as drainage, buildings and other ancillary items. In 1952-53, a railway connection between the Works (adjacent to Application Site boundary) and Bracklin commenced and was completed in 1956-57. Aerial photographs from 1973 indicate that railway infrastructure connecting Ballivor Bog, Carranstown, Bracklin and Lisclogher was in place by this time. No railway infrastructure was laid down in Lisclogher-West.

As discussed in Section 4.2.3.6, the track sleepers were approx. 1.8m in length and 0.76m apart. The total length of permanent track in the Application Site is 18.9km. The remaining track is termed temporary track, i.e., it was lifted and laid up to 12 times in a year for transport of peat from stockpiles.

Two level crossings are present at the Application Site, one at the Ballivor-Raharney road (since designated R156 in 1993), to facilitate train crossing from Ballivor Bog to Carranstown bog and vice versa, and one to facilitate crossing from Bracklin Bog to Lisclogher Bog across a local road. This level crossing went out of use post cessation of peat extraction at the Application Site. Standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all of the Applicant's crossing gates. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trans before reaching the level crossing.

The Applicant's railway infrastructure was designed to be moveable, supporting infrastructure that was laid to facilitate the transportation of peat off the bogs and into the Works for processing. Once peat stocks were exhausted from one area, the tracks were taken up and re-laid in new areas of bog which

had entered production. Thus, over the decades the railway line layout changed shape regularly. Furthermore, as areas fell out of permanent production, some railway lines were taken up completely. Records of where and when the railway tracks were moved to and from over the decades have not been retained.

Any movement or re-laying of railway tracks since the 1950s would be deemed to have taken place prior to their inclusion in the NIAH (which was published in 2004). The RPS provided by Meath and Westmeath County Councils were also published after 2004. Effects and mitigation are addressed in Section 13.4.



Plate 13-35: Level Crossing at R156 (Image courtesy of NIAH).



Figure 13-4: Record of Protected Structures within the Application Site.

13.4 Likely Significant Effects and Associated Mitigation Measures

13.4.1 Do Nothing Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities and all ancillary works commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently. other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the "do nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's

statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

13.4.2 Peat Extraction Phase: 1988- June 2020

13.4.2.1 Effect of Peat Extraction Phase – Indirect Effects on visual setting

Indirect effects, in terms of archaeology, architectural and cultural heritage are considered to be those effects which happen away from 'the site'. This includes effects on visual setting of any cultural heritage asset in the wider landscape. No indirect visual effects were identified which would have occurred during past peat extraction activities and all ancillary works. Sub-surface works such as drainage of peat and excavation of peat is not considered to cause a negative effect on the setting of monuments which are located away from the Application Site.

13.4.2.2 Effect of Peat Extraction Phase– Direct Effects

Direct effect refers to a 'physical impact' on a monument or site. In the past and up to the present day Bord na Móna has a statutory duty under the Turf Development Act 1998 (Section 56) to afford appropriate protection for the environment and archaeological heritage.

From the 1980s onwards, Ireland witnessed changing trends in the numbers of artefacts accessioned from peatlands reflecting adaptations in work practices in the industrial exploitation of Ireland's peatlands and legislative changes which offer greater protection to monuments and artefacts alike. In the period prior to 1988 (1945-1985) awareness of the archaeological potential of peatlands increased through museum fieldwork pioneered by Ellen Prendergast, Etienne Rynne, A. T. Lucas and Michael Ryan's Lough Boora excavation co-funded by Bord na Móna.

The 1980s saw a dramatic expansion in peat processing which led to National Monuments Service's licensing of excavations within bogs initially conducted by UCD's Irish Archaeological Wetland Unit (IAWU) and subsequently by archaeological contractors funded by the Applicant.

Since 1991 an annual programme of archaeological survey, initially funded by the National Monuments Service, has been conducted in Bord na Móna Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record.

Since 1998, the Applicant has had a statutory duty under the Turf Development Act 1998 ('1998 Act') (Section 56) to afford appropriate protection for the environment and the archaeological heritage (Section 56.- *The Company and each subsidiary shall ensure that its activities are so conducted as to afford appropriate protection for the environment and the archaeological heritage).*

The 1998 Act was in accord with the development of an *Agreed Principles for the Protection of Wetlands Archaeology in Bord na Móna Bogs* (1998) between the Minister for Arts, Heritage and the Gaeltacht, the National Museum of Ireland and the Applicant. The Agreed Principles set out 10

standards within which archaeology in the Bord na Móna peatlands were managed. Five Archaeological Liaison Officers were spread across the Bord na Móna Bog Groups and received training on how to deal with and report finds. Since 1998, all archaeological surveys were funded by the Applicant. The surveys have been accompanied by an annual programme of selective archaeological excavation and paleo-environmental analysis. By 2013, 64,000 of the c. 80,000-hectare land holdings of Bord na Móna had been subject to archaeological survey.

The Applicant's peat extraction activities and all ancillary works and impact on archaeology is also governed under the 2011 Code of Practice agreed between the then Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna (Appendix 13-1). The code includes a commitment by the Applicant to finance a balanced and cost-effective approach to archaeological investigation, excavation, post excavation and mitigation, and details the procedure to be followed if a suspected object is discovered. The Code of Practice has been implemented on all bogs operated by Bord na Móna and its contents are integrated into staff induction training. Prior to 2012 Agreed Principles for the Protection of Wetland Archaeology in Bord na Móna bogs were in place before they were updated and codified into the current Code of Practice.

All peatland surveys, assessment surveys and re-assessment surveys as well as any archaeological excavations within the Application Site were undertaken on all bogs operated by the Applicant as a result of the aforementioned Codes of Practice.

13.4.2.3 Effect of Peat Extraction Phase on RMP/SMRs

Since no known documented monuments or sites were identified during the past peatland surveys, no SMRs or RMPs are located within the bog. No effects on such sites were identified as a result of past peat extraction activities and all ancillary works.

13.4.2.4 Effect of Peat Extraction Phase on Clonycavan Man

The partial human remains are believed to have been retrieved by the Applicant's operatives from a peat production field that was in use for stockpiling of milled peat. In accordance with the report on the human remains (**Appendix 13-2**) Corcoran 2003, 1), the remains were disturbed both during the peat extraction process and later during the stockpile removal process. The milled peat was removed from the stockpile into the rail carriages by a mechanical excavator. The stockpiled material was then transferred to a storage shed at the Works area (adjacent to Application Site) where it then passed through a conveyor belt to extract larger organic waste material (tramp material). The human remains were discovered at this stage of the process.

The peat extraction activities and all ancillary works had a direct negative effect on the human remains in that it was likely that the remains came from the peat field surface underneath the stockpiled material which were dug out by the bucket of the machine. Although the suspected find spot was later examined by a team of archaeologists, no other remains were recovered. It was not concluded at the time of the report writing if the partiality of the bog body occurred in antiquity or at the time of the peat extraction.

The remains are now stored in the National Museum of Ireland.

Control Measures

1. *As part of peat processing training, all bog employees must read and adhere to the recommendations 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942 (**Appendix 13-4**).*
2. *All bog workers must stop all works and report to the Bog Manager if archaeological finds are encountered.*

3. *If materials thought to be of archaeological interest are encountered, the Bog Manager must report the findings to the Garda Síochána within 7 days who will then contact the Commissioner of Public Works.*

13.4.2.5 Effect of Peat Extraction Phase on unrecorded potential sub-surface sites

Bog landscape features were often utilised throughout all periods of history and the anaerobic conditions preserve organic matter, such as wood and leather, which does not often survive in more usual terrestrial archaeological conditions. Objects can be preserved in peatlands because of the acidity of peat and the anaerobic environment which exists within peatland deposits. This is particularly the case between 1988 and 2005 when fewer archaeological investigations and surveys had taken place. The 2005 Peatland survey, within the Application Site, would have allowed the identification of any finds, features or deposits on either the peat fields, or along drain sections which would have led to mitigatory investigations and excavations in selected areas within the Application Site.

Overall, it is possible that significant negative effects could have taken place to sub-surface finds and features, in particular, prior to 2005 where remains existed. This negative effect would have been mitigated by Peatland Surveys from 2005 onwards as well as the introduction of the 2011 Code of Practice. It is likely that potential effects on sub-surface finds and features from 2005 to 2020 were Slight to Moderate.

Control Measures

1. *As part of peat processing training, all bog employees must read and adhere to the recommendations 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942.*
2. *All bog workers must stop all works and report to the Bog Manager if archaeological finds are encountered.*
3. *If materials thought to be of archaeological interest are encountered, the Bog Manager must report the findings to the Garda Síochána within 7 days who will then contact the Commissioner of Public Works.*

2005 onwards

The 2005 Peatland surveys initiated by the National Monuments Service would have led to the discovery of any potential features within the peat. This control measure allowed for the investigation of features within the bog.

2011 onwards

The 2011 Code of Practice also saw the introduction of agreed principles between the National Monuments Service, the National Museum and Bord na Mona. The control measures from 2011 onwards were as follows:

1. *The Minister for Arts, Heritage and the Gaeltacht has a responsibility to protect the archaeological heritage and to exercise powers of preservation, under the National Monuments Acts 1930-2004, taking account of the European Convention on the Protection of the Archaeological Heritage (Valletta).*
2. *The Minister's statutory responsibilities include the maintenance of the Record of Monuments and Places, with the aim of providing protection to all known archaeological monuments including those uncovered in Bord na Móna bogs.*
3. *The Director of the National Museum of Ireland has a responsibility to enforce state ownership of all archaeological objects and to safeguard the treatment of all archaeological objects before their accession into the State's repository, under National*

Monuments Acts 1930-2004 and the National Cultural Institutions Act 1997, taking account of the European Convention on the Protection of the Archaeological Heritage (Valletta)

4. *Bord na Móna plc is a company with a statutory mandate, under the Turf Development Acts 1946-1998, to develop the national peat resource.*
5. *The development of peatlands has considerable archaeological implications which must be addressed given that the archaeological heritage is a non-renewable resource.*
6. *Bord na Móna has a statutory duty under the Turf Development Act 1998 (section 56) to afford appropriate protection for the environment and the archaeological heritage.*
7. *Bord na Móna will finance a balanced and cost effective approach to archaeological investigation, excavation, postexcavation and mitigation on the basis of the developer pays principle and in keeping with the Minister's stated policy in this regard.*
8. *Bord na Móna will engage a Project Archaeologist to develop archaeological strategy and to oversee the smooth running of the archaeological response to peat extraction in Bord na Móna bogs.*
9. *The adoption of a partnership approach between the Minister, the Director and Bord na Móna in pursuit of the delivery of Government policy taking account of the implications for archaeology. To this end the Archaeology Management Liaison Committee has been set up consisting of representatives of the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna, including the Project Archaeologist and Consultant Archaeologists working on Bord na Móna peatlands. The Committee will meet regularly to agree overall strategies in relation to the mitigation of peat extraction.*
10. *Appropriate strategies will be developed by the Archaeology Management Liaison Committee to minimise direct impacts on archaeology taking account of Bord na Móna's contractual obligations, annual production plans, design and safety implications, environmental and other impacts and costs.*
11. *All parties agree that mitigatory planning at the earliest opportunity minimises the impact on the archaeological heritage.*
12. *Bord na Móna will strive, as far as is reasonably possible, within its statutory remit, to avoid negative impacts on archaeological monuments. In cases where it is not possible to avoid impacting on monuments Bord na Móna, the Minister and the Director will cooperate to ensure, as far as possible, that appropriate archaeological mitigation is carried out in advance of peat extraction.*
13. *Prospecting for archaeological monuments, archaeological objects and other such remains, other than in circumstances approved by the Minister, in consultation with the Director, is limited to the confines of the area under peat extraction.*
14. *All parties are committed to dealing with the archaeological implications of peat extraction in a balanced and cost effective manner consistent with*

    a) *Observing Bord na Móna's requirement to extract peat on an extensive scale*
    b) *Annual production targets in relevant bogs*
    c) *A level of excavation, post-excavation and recording of archaeological monuments and archaeological objects, impacted upon by peat extraction, that is acceptable to the Minister, having consulted with the Director, and preservation in-situ of monuments in those particular circumstances where required by the Minister and which would be reasonable in practice.*

15. *Each party reserves the right to review decisions.*
16. *All parties agree that the Archaeology Management Liaison Committee will monitor the operation of this Code of Practice and carry out a formal review within three years of its adoption and at agreed intervals thereafter*

13.4.2.6 Effect of Peat Extraction Phase on the Record of Protected Structures and NIAH

One structure listed in the Record of Protected Structures is located within the Application Site boundary. This consists of the RPS 021-008 Permanent narrow gauge Bord na Móna railway line. The railway is described above in Section 13.3.13.

These railways have been laid from the 1950s onwards to facilitate the transport of turf and milled peat to the Works areas. The tracks were extended over the decades where required and also been re-laid and removed / overgrown in some locations. The majority of rails are still visible however as is the Level crossing on the R156 between Ballivor Bog to the south and Carranstown to the north.

The tracks are now largely extant and in this regard past peat extraction activities and all ancillary works would not have impacted on the railway tracks but rather resulted in their construction in the first place. The features are now a cultural heritage asset which have survived throughout the lifetime of the bog thus leaving a slight positive effect and a reminder of past industrial peat activities.

Control Measures

The fixed gauge railway lines identified in the RPS form part of the Midlands industrial heritage and have been retained in consultation with National Monuments and the Local Authority in all future plans and proposals for the Application Site including the Remedial Phase.

13.4.2.7 Impact of Peat Extraction Phase on Local Cultural Heritage (Tonduff).

This area is located towards the south-east part of Bracklin bog, between the railway along the eastern margin and the main travel path further west. It has developed around a low mineral island and this area was also farmed in the past. 19th Century field walls are visible on the OSI 2nd edition 25 inch map. The area now contains dry meadow grassland and is surrounded by Birch woodland that has developed on cutover bog, with old face-banks still present. The remains of a 19th century house in ruins are described above in Section 13.3.11.1.

The house is in a poor state of disrepair although past peat activities have not resulted in the demolition of the structure. The foundations of the house are now largely overgrown with trees growing within the structure itself. The revegetation of the area has allowed the structure to survive somewhat albeit in poor condition. No effects have occurred to the structure as a result of past peat extraction activities and all ancillary works which has become ruinous over time.

Control Measures

Past peat extraction activities and all ancillary works have not impacted on the structure and the 19th century house has survived, albeit ruinous, to the present day. No control measures are proposed in this regard.

13.4.3 Current Phase: June 2020 to present day

Current activities at the Application Site include the transportation of previously extracted peat off the bogs and decommissioning, rehabilitation and environmental monitoring as part of the EPA licence. This is detailed in Chapter 4, Section 4.8. Bord na Móna ceased peat extraction across all bogs including at the Application Site in June 2020. It is a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that:

'*10.1 following termination of use or involvement of all or part of the site in the licenced activity, the licensee shall:*

> *10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*

In terms of archaeology, architecture and cultural heritage, since peat removal and groundworks are complete, it is considered that no direct effects would occur during the Current Phase.

Potential indirect effects (visual effects) of the Current Phase are scoped out as the Current Phase activities are not considered to have a wider landscape negative effect on the Cultural Heritage Environment. Archaeological monuments and features of architectural heritage merit which are located away from the Application Site are not capable of having their settings affected by localised / transient works within the Application Site.

Potential Pre-Mitigation Effects

No effects from 2020 to the present day are considered to have occurred since peat extraction and drainage construction works have ceased.

Control measures

No control measures are deemed necessary since peat extraction, and drainage construction works have ceased.

13.4.3.2 Cumulative & In Combination Impacts

Bord na Móna ceased peat extraction across all bogs including at the Application Site in June 2020. It is a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that:

'*10.1 following termination of use or involvement of all or part of the site in the licenced activity, the licensee shall:*

> *10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*

In terms of archaeology, architecture and cultural heritage, since peat extraction has ceased, it is considered that no direct effects would occur during the Current Phase. In this regard therefore, current activities will not result in any cumulative effects, either direct or indirect.

13.4.4 Remedial Phase

13.4.4.1 Effect of Remedial Phase

The Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site has been described in detail in Chapter 4 Section 4.9.1 and is included in Appendix 4-2 of this rEIAR. The rehabilitation programme falls under the IPC licence in the same way as past peat extraction activities and all ancillary works, and in this regard any impacts as a result of drain blocking or trekking over peat as part of the restoration programme fall under the current Code of Practice (2012) between the Applicant and the now Department of Housing, Local Government and Heritage. The Applicant has produced a Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach

under IPC licence. The IPC licence is presented in Appendix 4-1 with detail on the rehabilitation programme provided in Appendix 4-2.

Mitigation measures to be implemented as part of the Cutaway Bog Decommissioning and Rehabilitation programme are under the remit of the aforementioned bodies therefore. The Code of Practice is presented in **Appendix 13-1** of the rEIAR and will mitigate against the potential for significant effects during the Remedial Phase.

Potential Pre Mitigation Effects

Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect.

Mitigation Measures

Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works, through the implementation of mitigation measures detailed in the 2012 Code of Practice.

13.4.4.2 Cumulative & In Combination Effects

In terms of direct cumulative effects, remedial works within the Application Site which require any ground works or drain blocking activities could potentially result in cumulative effects when considering other projects, including the proposed Ballivor and Bracklyn windfarm construction phases. Any increase to groundworks / excavation works within the peat could arise in direct cumulative effects to any potential sub-surface archaeological finds or features.

There are a number of mitigating factors however which include the implementation of the current 2012 Code of Practice which falls under the IPC licence. The Applicant has produced a Cutaway Bog Decommissioning and Rehabilitation and Plan for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under IPC licence. The IPC licence is presented in Appendix 4-1 with detail on the rehabilitation programme provided in Appendix 4-2.

Mitigation measures to be implemented as part of the Cutaway Bog Decommissioning and Rehabilitation programme are under the remit of the aforementioned bodies therefore. The Code of Practice is presented in **Appendix 13-1** of the rEIAR and will mitigate against the potential for significant effects during the Remedial Phase and thus reducing potential cumulative and in-combination effects.

13.5 Residual Effect

13.5.1 Peat Extraction Phase: 1988- June 2020

The residual effect of the Peat Extraction Phase on Clonycavan Man is regarded as Moderate-Significant.

Overall, it is possible that significant negative effects could have taken place to sub-surface finds and features, in particular, prior to 2005 where remains existed. This negative effect would have been mitigated by Peatland Surveys from 2005 onwards as well as the introduction of the 2011 Code of Practice. In this regard it is considered that that residual effects on sub-surface finds and features from 2005 to 2020 were Slight to Moderate while residual effects between 1998 and 2005 may have been Moderate to Significant.

13.5.2 Current Phase June 2020 to present day

In terms of archaeology, architecture and cultural heritage, since peat extraction has ceased, it is considered that no direct effects would occur during the Current Phase. No direct effects as a result of removal of stockpiled peat, EPA monitoring activities, etc are identified. Since no effects were identified without the need for control measures, no residual effects will occur.

13.5.3 Remedial Phase

Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect. Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works. In this regard the potential residual effect on sub-surface archaeology, if present, may be Slight-Moderate.

13.6 Significance of Effects

13.6.1 Peat Extraction Phase: 1988-2020

As the bog body Clonycavan Man was directly, negatively and permanently affected by peat extraction activities and all ancillary works, the overall significance of effects on same as a result of the Peat Extraction Phase is considered to be Moderate-Significant. The remains have been retrieved, studied and preserved for posterity and are now in the National Museum of Ireland.

Past extraction activities and all ancillary works, in particular from 1988 to 2005 including drains, milling, and extraction could have resulted in a significant, permanent negative effect if sub-surface features were present within the peat. This potential effect is considered to be Slight to Moderate from 2005 to 2020 due to commissioned Peatland Surveys allowing identification of features, if present.

13.6.2 Current Phase: June 2020 to present day

As no effects were identified as a result of the Current Phase, the significance of effects is considered to be Imperceptible.

13.6.3 Remedial Phase

The overall significance of effects on subsurface archaeology, if present, as a result of the Remedial Phase is considered to be Slight-Moderate.

13.7 Cumulative and In Combination Effects

Cumulative effect is defined as 'the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects' (EPA 2022). Cumulative effects encompass the combined effects of multiple developments or activities on a range of receptors. In this case, the receptors are the archaeological monuments and architectural/cultural heritage sites in the in the Application Site. Direct effects to sub-surface archaeological features/sites can occur as a result of peat removal and groundworks during the Peat Extraction Phase (1988-2020), as part of the Current Phase (June 2020 – present day) and Remedial Phase, as well as the potential future development of Bracklyn and Ballivor wind farms. When all of these activities are combined, they have the potential to have cumulative effects.

The archaeological impact assessment undertaken above in this chapter outlines those significant effects that have occurred within the Application Site as a result of the peat extraction activities and all ancillary works.

Due to peat extraction activities and all ancillary works within the Application Site boundary in particular, prior to 2005 when archaeological investigations and surveys had not been undertaken, the potential for significant cumulative effects with other local developments (located outside the Application Site, including forestry, agricultural development) on the archaeological environment may have occurred. Peat extraction activities and all ancillary works could have had cumulative (direct) effects with other off-site projects. Similarly, when considering the Peat Extraction Phase 1988-June 2020 with peat extraction activities and all ancillary works on the Application Site from 1948-1988, cumulative effects are also possible. Given the nature of the peat extraction activities and all ancillary works during both the 1988-2020 period and the 1948-1988 period, those effects are largely concerned with sub-surface archaeological finds, features and deposits. As outlined in Chapter 4, the primary and greatest land-use change associated with peat extraction activities and all ancillary works on the Application Site occurred during the initial drainage and vegetation removal of the bogs in advance of peat extraction. This impact would have predominantly occurred in advance of 1988 at the Application Site. As discussed in Section 13.4.2.5 above, it is likely that the pre 1988 drainage, shrinkage, compression and the extraction of peat could have had permanent and profound adverse cultural heritage effects should sub-surface finds and features exist in areas which were subject to peat extraction activities and all ancillary works. This is particularly the case between 1988 and 2005 when fewer archaeological investigations and surveys had taken place. When considered cumulatively with activities which took place between 1948 and 1987, there is potential for increased cumulative direct negative effects to sub-surface archaeology if present within the Application Site.

It is intended to utilise the Application Site for both peatland remediation (rehabilitation) and wind energy infrastructure and to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits.

As such, Cutaway Bog Decommissioning and Rehabilitation Plans are assessed as part of the planning application for this Project.

The environmental impact assessment for the proposed Ballivor Wind Farm application includes an assessment of the implementation of the rehabilitation plans in conjunction with the construction, operation and decommissioning of the wind farm. The overall footprint of the proposed Ballivor wind farm will be less than 3% of the total area of the Application Site, and therefore will 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 wind farm infrastructure. The proposed Ballivor Wind Farm is assessed in a separate EIAR in terms of direct and indirect effects on the Cultural heritage resource with a specific suite of mitigation measures so as to avoid any negative effects to the sub-surface archaeology that may exist within the site. When the proposed Ballivor wind farm is considered with the past peat extraction activities and all ancillary works, current works and future rehabilitation works, potential direct effects will not increase due to the implementation of archaeological mitigation during construction. Mitigation measures for the proposed Ballivor Wind Farm include avoidance of cultural heritage features and archaeological monitoring during construction. The latter will allow for any potential archaeological features to be dealt with appropriately under licence from the National Monuments Service. Overall cumulative effects when considering past peat extraction activities and all ancillary works and the proposed Ballivor Wind Farm will not occur.

The proposed Ballivor windfarm will have slight effects on the setting National Monuments in State Care such as Frewin Hill and Trim Castle as well as others within 10km of the proposed turbines. In the context of past peat extraction activities and all ancillary works, and rehabilitation works, the latter are not capable of resulting in any negative effects on setting of monuments in the wider landscape setting (monuments away from the Application Site) as the peat activities are localised and transient works.

When considered together cumulative effects on setting will not occur since no effects on setting were identified as a result of Peat Extraction Phase past peat extraction activities and all ancillary works Current Phase (i.e removal of stockpiles etc) or the Remedial Phase (i.e proposed rehabilitation works).

Due to the localised nature of the past peat extraction activities and all ancillary works which were limited to within the Application Site boundary, there is no potential for significant cumulative effects in-combination with other local developments on archaeological, architectural, and cultural heritage.

13.8 Conclusion

This archaeological, architectural, and cultural heritage chapter was prepared by Tobar Archaeological Services Ltd. It presents the results of an archaeological, architectural and cultural heritage impact assessment for a remedial EIAR at the Application Site.

Peat Extraction Phase:

Recorded Monuments

No recorded monuments are located within the Application Site boundary therefore no direct effects occurred in this regard.

Sub-Surface Archaeology

Bog landscape features were often utilised throughout all periods of history and the anaerobic conditions preserve organic matter, such as wood and leather, which does not often survive in more usual terrestrial archaeological conditions. Objects can be preserved in peatlands because of the acidity of peat and the anaerobic environment which exists within peatland deposits. It is likely that the pre 1988 drainage, shrinkage, compression and the extraction of peat could have had permanent and profound adverse cultural heritage effects should sub-surface finds and features exist in areas which were subject to peat extraction activities and all ancillary works. This is particularly the case between 1988 and 2005 when fewer archaeological investigations and surveys had taken place. The Archaeological Survey of Ireland 2005 Peatland Survey, within the Application Site, would have allowed the identification of any finds, features or deposits on either the peat fields, or along drain sections which would have led to mitigatory investigations and excavations in selected areas within the Application Site.

A number of archaeological surveys were previously carried out as part of the Applicant's 2005 Peatland Survey within these bogs during the lifetime of the peat extraction activities and all ancillary works. A summary of the available results of such surveys and/or any reassessment surveys is presented above. No archaeological sites were discovered during the peatland surveys.

Partial human remains consisting of a torso, head and upper arms were recovered at the Works (adjacent to Application Site) on 21st February 2003 by the Applicant's personnel. As Ballivor Bog produces moss peat, the peat is collected and screened to ensure no foreign objects are within it. The human remains were discovered after screening and deposited with any other non-peat items at the Works. The Applicant was able to identify the location of the stockpile that was being screened. This was in the townland of Clonycavan approximately 1.5km southeast of the Works. The area was inspected and systematically walked by the author (then of ADS Ltd) and Ann Lynch of the DOEHLG (now DoHLGH) during a field visit on the 28th February 2003. On the 12th August 2003 a team of one supervisor, one site assistant and two archaeologists under the direction of Eoin Corcoran, ADS Ltd (Licence Ref.: 03E1221) investigated the find spot by shovel scraping, sweeping and trowelling a 100m long area. No further remains were recovered. This demonstrates the high archaeological potential of the bog.

Numerous stray finds are registered in the National Museum of Ireland for the majority of the 5 no. bogs in the Application Site and again demonstrate the high archaeological potential of the Application Site. The stray finds for each bog are described in Section 13.3.10.

It is likely that past peat extraction activities and all ancillary works, prior to 2005 had a negative, permanent and significant effect on any potential sub-surface features or finds within the Application Site in the same way as Clonycavan man was affected by peat activities (although partially recovered out of context). It is possible that the proposed Bog Rehabilitation works activities such as drain blocking, re-wetting, bull dozing of any remaining stock piles etc will also effect potential archaeological finds, features and deposits. These activities fall under the Code of Practice 2012 in the same way as peat extraction activities and all ancillary works are dealt with. All such activities are being undertaken under the IPC licence and in this regard, therefore, any mitigation measures implemented are under the remit of the Applicant and the now Department of Housing, Local Government and Heritage and will mitigate the potential for significant effects.

Built Heritage (Protected Structures)

One structure listed in the RPS is located within the Application Site boundary. This consists of the RPS 021-008 Permanent narrow gauge Bord na Móna railway line. The centre point for this structure is located to the northeast of the Works, adjacent to the Application Site. The past peat extraction activities and all ancillary works, and the need to transport sod turf and milled peat required the construction of an extensive rail network. The railways have been laid since the 1950s and were extended and re-laid in accordance with the requirements at the time. The permanent railway and its ancillary structures such as level crossing gates have since been added to the Record of Protected Structures and are largely still extant. **No effects** to the permanent gauge railways were identified as a result of past peat extraction activities and all ancillary works.

Local Cultural Heritage (Tonduff)

This ruinous settlement now contains dry meadow grassland and is surrounded by Birch woodland that has developed on cutover bog, with old face-banks still present. The remains of a 19th century house in ruins are described above in Section 13.4.2.7 above. Past peat extraction activities and all ancillary works **have not** affected the structure and the 19th century house has survived, albeit ruinous, to the present day. No mitigation measures are proposed in this regard.

Current Phase

Current activities at the Application Site include the transportation of previously extracted peat off the bogs and decommissioning, rehabilitation and environmental monitoring as part of the EPA licence. In terms of archaeology, architecture and cultural heritage, since peat extraction ceased in June 2020, it is considered that no direct effects would occur during the Current Phase.

Potential indirect effects (visual impacts) of the Current Phase are scoped out as the current phase of activities are not considered to have a wider landscape negative effect on the Cultural Heritage Environment. Archaeological monuments and features of architectural heritage merit which are located away from the Application Site are not capable of having their settings affected by localised / transient works within the Application Site. No effects from 2020 to the present day are considered to have occurred since peat extraction has ceased. No mitigation measures are deemed necessary since peat extraction has ceased.

Remedial Phase

The rehabilitation programme falls under the IPC licence in the same way as past peat extraction activities and all ancillary works and in this regard any effects as a result of drain blocking or trekking over peat as part of the restoration programme fall under the current Code of Practice (2012) between the Applicant and the now Department of Housing, Local Government and Heritage. The Applicant

have produced a Cutaway Bog Decommissioning and Rehabilitation Plan for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under IPC licence. Mitigation measures to be implemented as part of the Cutaway Bog Decommissioning and Rehabilitation Plan programme are under the remit of the aforementioned bodies, therefore the Archaeology Code of Practice (presented in Appendix 13-1 of the rEIAR) will mitigate against the potential for significant effects during this phase. Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect. Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works and in this regard the overall significance of effects will be slight – moderate.

14. MATERIAL ASSETS

This chapter reports the findings of an assessment of any likely significant effects on material assets which may have occurred or are occurring as a result of Bord na Móna's (the Applicant) historic peat extraction and ancillary activities from July 1988 to the present day that have been carried out within the Application Site. Chapter 4 (Description of the Development) provides a full description of the elements of the Project; the baseline as of July 1988, the activities from July 1988 to the cessation of peat extraction in June of 2020, the management of the Application Site since June 2020, and the activities relating to historic peat extraction intended to be carried out into the future. The assessments in this chapter will determine the any likely significant effects that occurred on material assets (or are likely to occur) during three differing timeframes termed 'phases' (as described in Chapter 4):

- **Peat Extraction Phase:** The likely significant effects on material assets which may have occurred between July 1988 and June 2020;
- **Current Phase:** The likely significant effects on material assets which may have occurred since the cessation of peat extraction in June 2020 to present day; and,
- **Remedial Phase:** The likely significant effects on material assets that are likely to occur during future plans to restore the Application Site.

As outlined in the EPA Guidelines (2022), material assets can be taken to mean built services and infrastructure, roads and traffic, and waste management. In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU now includes those heritage aspects as components of cultural heritage, which are addressed in Chapter 12 of this rEIAR. Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 7 Land, Soils and Geology, Chapter 8: Hydrology and Hydrogeology, Chapter 9: Air Quality and Chapter: 10 Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5 Population and Human Health. The railway infrastructure at the Application Site is considered in Chapter 12: Archaeology and Cultural Heritage.

This chapter of the rEIAR addresses the likely significant effects of the peat extraction activities and all ancillary works on transportation and utilities (electricity and water), telecommunications and aviation assets which are economic assets of human origin.

14.1.1 Statement of Authority

This section of the rEIAR has been prepared by Ellen Costello and reviewed by Sean Creedon, of MKO. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen has been involved in a range of large-scale commercial projects and renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment.

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

professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

14.1.2 Assumptions and Limitations

Traffic and Transport

- Transport movements were calculated on the basis that an average of 26 tonnes of peat was carried in each truck per delivery. Annual extraction volumes were divided by 26 to get the average number of deliveries from the Application Site for that given year;
- TII traffic count data which is used to compare the Applicant's generated traffic is only available from certain years (2020-2024) for all count locations. There are certain routes that have historical counts that date back to 1997 available on the TII website;
- The exact routes that the Applicant's trucks would have utilised to reach various destinations over the years e.g. power stations are uncertain. Likewise, the total number of movements per route is uncertain. Therefore, the average daily number of movements is assessed per route which produces a larger traffic impact than what would have occurred in reality. Where possible, the most direct route with associate traffic count data (or representative count data) is used. Where this is not available, the nearest route with count data is reviewed. The lowest, available, annual average daily traffic count data (AADT) as recorded by TII is compared with the average annual daily traffic volumes generated by the Peat Extraction Phase, the Current Phase and Remedial Phase. Estimates are used where necessary; and,
- Details pertaining to ancillary activities that would give rise to vehicular movements such as construction work, general collections and deliveries, fuel deliveries are not available or there is limited data available. It is considered that the level of movements associated with these activities are not significant in comparison to the conservative levels of truck/vehicle movements arising from peat transportation and staff movements.

Other Material Assets

- Planning and construction history details pertaining to the original water supply connection supply, and the original electrical substation which, as discussed in Section 14.3.4.1.2 pre-dates the 10/20kV substation which was granted consent by Westmeath County Council in 2005 (Ref. 05/2348), are not available.

14.2 Traffic and Transport

14.2.1 Introduction

14.2.1.1 Background and Objectives

The purpose of this section is to assess the effects on roads and traffic of the traffic movements that were generated during the Project.

14.2.1.2 Guidance and Legislation

This section of the rEIAR has been completed in accordance with the guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely significant effects associated with peat

extraction activities and all ancillary works at the Application Site. Further information on the classification of effects used in this assessment is presented in Section 1.7.2 of this rEIAR.

14.2.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Section 2.6 of Chapter 2 of the rEIAR.

Transport Infrastructure Ireland

A scoping request was sent to Transport Infrastructure Ireland (TII) the 2nd of December 2021. A response was received on the 8th of December 2021 outlining TII's recommendations for developments which may have future impacts on the road network. Please see Appendix 2-1 for scoping correspondences with consultees in relation to this rEIAR.

A second scoping request was sent to TII on the 14th of February 2024. A response was received on March 20th 2024, clarifying that the rEIAR Scoping document circulated is a copy originally distributed in 2021, to which TII responded under reference TII21-116436 in December 2021. The recommendations provided by TII offer only general guidance for the preparation of an EIAR, which may impact the national road and light rail networks.

Department of Transport

A scoping request was sent to the Department of Transport on the 2nd of December 2021. A response was received on the 16th of December stating that the Department has no observations to make at this time. Please see Appendix 2-1 for scoping correspondences with consultees in relation to this application.

A second scoping request was sent to the Department of Transport on the 14th of February 2024. A response was received on the 29th of February stating that the Department has no observations to make at this time.

14.2.2 Methodology

The assessment adopts the guidance for such assessments set out by TII in the document *'Traffic and Transport Assessment Guidelines May 2014*[1].

The Traffic and Transport Section of this rEIAR chapter is set out as follows:

1. A review of the historic and existing transport infrastructure in the vicinity of the Application Site, to establish the 1988 Baseline for this assessment (Section 14.2.3)
2. A description of the traffic movements associated with the Project in each phase; Peat Extraction Phase, Current Phase and the Remedial Phase (Section 14.2.4);
    a. Peat extracted from the Application Site was transported via internal rail to Ballivor Works (the Works) for appropriate processing and was subsequently moved from the Works to its end destination via the road network. The main routes identified for the Project are from the Application Site to end users such as Rhode ESB Power Station, Kilberry Works, Cúil na Móna Works, Croghan Briquette Factory, and from the Works to the horticulture industry overseas via Dublin Port
    b. The volume of traffic generated on the road network from peat extraction activities and all ancillary works through all Project phases is extrapolated from the annual peat

[1] *TII Publications May 2014 Traffic and Transport Assessment Guidelines. Available at: https://www.TIIpublications.ie/library/PE-PDV-02045-01.pdf*

volumes of extracted peat over the Peat Extraction Phase, from annual stockpiled peat delivery over the Current Phase, and from employment figures across all Project phases.

c. Utilising the TII Traffic Data website (www.nratrafficdata.ie), historical traffic counts were reviewed along the main routes from the Application Site to end users. TII traffic data predominantly covers the 2020-2024 period. Historical count data are available for some routes, and where available, have been used.

d. As a conservative measure, traffic volumes generated by the Project across all Project phases have been assessed against the lowest Average Annual Daily Traffic (AADT) data. For the Peat Extraction Phase, a theoretical 1988 AADT value has been quantified using Census population data for the State. The 31% reduction in State population between Census years 1986 and 2021 was also applied to the earliest TII Count data available i.e 2020. The lowest AADT value is compared with the Project's annual average daily traffic volume. By using the lowest AADT as a comparison, the greatest potential impact of traffic volumes generated by the Project is identified. The TII AADT data for the year 2020 is based on counts taken during a period of Covid-19 related government travel restrictions which would have resulted in an even lower level of daily traffic volumes. As this data is being used to infer a theoretical 1988 value for reduced traffic movements, the TII 2020 data has not been adjusted relative to Covid-19. This is to infer a theoretical precautionary scenario as Table 14-4 below presents the Project's traffic movements as a percentage of the lowest recorded daily traffic count. Similarly, the TII 2020 data has been utilised for the Current Phase and Remedial Phase as it is the lowest possible TII AADT recorded, and as such, presents a precautionary scenario.

e. The average daily traffic movements from the Application Site would have travelled in various directions; however, as a conservative measure, the following sections assess the impact of the total daily Project traffic movements on each route, as if all daily movements travelled to the same destination at one time. Therefore, the results generated produce a much greater impact that would have occurred in reality.

14.2.3 Establishment of Baseline (July 1988)

As described in Chapter 4, by July 1988, drainage had been installed for peat extraction at the Application Site. For the year 1988, 66,514 tonnes of peat was extracted. The traffic movements associated with this volume of peat extracted on the Application Site is detailed in Section 14.2.4.1 below.

Railway infrastructure was present at all bogs except Lisclogher West. The main entrance points to the Application Site comprised a northern and southern entrance off the Ballivor-Raharney road (which was officially designated as the R156 in 1993) leading into Carranstown and Ballivor Bogs, respectively. Adjacent to the Application Site, the Ballivor Works comprised a peat loading facility, canteen, storage sheds, maintenance buildings, staff carparks, Heavy Goods Vehicles (HGVs) storage area, refuelling area and railway terminal for the internal Bord na Móna railway and was therefore the main hub of both the Application Site and the Ballivor Bog Group writ large. It was from here that most traffic generated from the Application Site entered the local road network, with the balance of traffic generated at the Application Site joining the local road network via the site access points on various local roads as described below.

The Ballivor-Raharney road (R156) cuts through the Application Site in an east to west direction, separating Ballivor Bog to the south from the remaining four bogs to the north. The Application Site was served by the R156 and several local roads to the north, south, east and west, providing connectivity for the Application Site to the N51 and N52 (which were both designated National roads in 1977) to the north, and to the N4 (which was designated as a Motorway, the M4, in 1994) to the southwest, approximately 8.3km from the Application Site. A local road ran northwest to southeast separating Lisclogher West Bog from Lisclogher Bog. Various local roads provided access to the

Application Site as well as public rights of way which were designated into Lisclogher and Ballivor bogs. The closest settlements to the Application Site were Ballivor (approx. 2.2km east), Delvin, (approx. 2.5km north-northwest), and Raharney (approx. 3.7km west).

Peat extracted at the Application Site during the year 1988 was transported via internal rail to the Works, and from the Works onwards via road to one of a range of end destinations including Rhode ESB Power Station, Kilberry Works, Cúil na Móna Works, Croghan Briquette Factory, and from Ballivor Works to the horticulture industry overseas via Dublin Port.

As detailed in Section 5.3.3.2 in Chapter 5 of this rEIAR, employment figures at the Application Site for the year 1988 are estimated at 80 permanent employees and 20 seasonal employees.

14.2.3.1 Railways

The Bord na Móna railway infrastructure is described in detail in Section 4.2.3.6 and Section 4.5.5.1 of Chapter 4 Description of Development. A general description is included below as it forms part of the baseline environment considered relevant in this chapter. However, as a portion of the railway infrastructure is listed in the Record of Protected Structures ('RPS'; RPS No. 021-008) and is included in the National Inventory of Architectural ('NIAH'; Reg. No. 15402102), it is considered industrial heritage. The NIAH was published in 2004, and the RPS after 2004. Impacts on this asset are further assessed in Chapter 13 Archaeology and Cultural Heritage.

By 1988, peat extraction areas were served by a dynamic network of narrow-gauge rail tracks within the Application Site. As discussed in detail in Chapter 4, the Applicant's Annual Reports indicate they were first laid down in Ballivor and Bracklin bogs in the 1950s. Aerial photographs from 1973 indicate that railway infrastructure connecting Ballivor, Carranstown, Bracklin and Lisclogher bogs was in place at that time.

By 1988, two level crossings were in place at the Application Site; one at the Ballivor-Raharney road to facilitate train crossing from Ballivor Bog to Carranstown Bog and vice versa, and one to facilitate crossing from Bracklin Bog to Lisclogher Bog across a local road. Standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all of the Applicant's crossing gates. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trains before reaching the level crossing.

The railway tracks comprise permanent and temporary lines laid to facilitate the transportation of peat off the Application Site and into the Works for processing. Once peat stocks were exhausted from one area, the temporary tracks were taken up and re-laid in new areas of bog which had entered production. Thus, over the decades the railway line layout changed regularly. Furthermore, as areas fell out of production, some permanent railway lines were taken up completely. Records of where and when the temporary railway tracks were moved to and from over the decades have not been retained. The permanent tracks comprised one main railway route from each bog within the Application Site leading into the Works building where peat de-loading, maintenance and refuelling occurred.

The road network and access points described above remained the same throughout the proceeding decades since 1988 and still define the present-day environment.

14.2.4 Traffic Movements

14.2.4.1 Peat Extraction Phase 1988 to June 2020

Traffic movements to and from the Application Site during the Peat Extraction Phase can be found in Table 14-1 below.

Peat Extraction Activities

Average annual peat HGV movements from the Application Site from 1988 to June 2020 (when peat extraction ceased on the Application Site) can be found in Table 14-1.

In order to identify the average number of traffic movements out of the Application Site, the following assumptions have been made:

- Large transport vehicles are assumed as 26 tonne HGVs, all remaining vehicles are assumed as Light Goods Vehicles (LGVs); and,
- A 252-day work year is assumed (5 day working week over 52 weeks of a year); this is a precautionary assumption as the nature of the peat extraction works is that it is seasonal over the course of the year (only occurring from April to September) and would in reality be less than 252 days.

As detailed in Table 14-1, the average number of movements out of the Application Site per year for the period 1988 to June 2020 was 2,815, or 11 per day, based on a 252-day work year. Using the precautionary principle, it is assumed that all transport vehicles returned to the Application Site and as such, all movements in Table 14-1 have been doubled to reflect returning vehicles. Therefore, the average annual HGV movements generated by the Application Site was 5,629 or 22 per day (based on a 252-day work year).

It is estimated that over the 33-year period from 1988 to June 2020 inclusive, 92,880 HGV movements of peat were undertaken resulting in a total of 185,760 HGV traffic movements when vehicle return journey trips are counted. It should be noted that while extraction ceased in June 2020, traffic movements continued throughout the year where operations at the Application Site were focused on transferring stockpiled peat to the Ballivor Works for processing before being transported out of the Application Site.

Personnel Traffic Movements

Employment figures at the Application Site for the year 1988 are estimated at 80 permanent employees and 20 seasonal employees. From 2013 to June 2020, the Applicant employed on average 20 employees full time and on average 5 seasonal employees per annum in peat extraction activities and all ancillary works at the Application Site. It is likely that staff numbers at the Application Site gradually declined in the years prior to 2013, as there is no record of a significant change to site activities between 2012 and 2013 that would account for the significant disparity in the estimated average numbers of staff up to 2013 versus the recorded average staff numbers from 2013 onwards at the Application Site. For the purposes of the assessment a gradual reduction in staff numbers in the years prior to 2013 is not assumed. Therefore, the projected staff movements in the years leading up to 2013 as outlined in Table 14-1 would in reality have been less.

While extracted peat was exported from the Works throughout the year, peat extraction itself was seasonal, only occurring from April to September inclusive (i.e. 6 calendar months, corresponding to 126 workdays). As such, the majority of personnel travelled to and from the Application Site during these months only. The means by which personnel travelled to the Application Site included for walking, cycling, by bus, by rail and by car. Using the precautionary principle, personnel traffic movements have been calculated assuming a car (i.e. a LGV), as the sole transport mode on the road network for all staff personnel.

Using the precautionary principle, personnel traffic movements calculated in Table 14-1 considers the following:

- From the period 1988 – 2012 it is assumed all 100 personnel (80 permanent and 20 seasonal) travelled to and from the Application Site throughout the year (i.e for 252 days a year). As detailed above, seasonal personnel would only travel for 6 months a

year, but for the purposes of this assessment and to present a highly conservative precautionary scenario, it is assumed that the seasonal staff travelled all year round.
- From the period 2013-2020 it is assumed all 25 personnel (20 permanent and 5 seasonal) travelled to and from the Application Site throughout the year (i.e for 252 days a year). As detailed above, seasonal personnel would only travel for 6 months a year, but for the purposes of this assessment and to present a highly conservative precautionary scenario, it is assumed that the seasonal staff travelled all year round.
- Using the precautionary principle, it is assumed that 1 personnel member travelled per LGV to and from local towns, villages and rural settlements to the Application Site.
- Using the precautionary principle, staff personnel movements for the year 1988 have been extrapolated from the full year of employment rather than the period from July 1988 to December 1988.

Therefore, for the period 1988-2021, 100 vehicles per day were considered to have travelled to the Application Site each day for 252 workdays. For the period 2013-2020, 25 vehicles per day were considered to have travelled to the Application Site each day for 252 workdays. For both periods, it is assumed that each vehicle took two trips per day i.e to and from the Application Site. Therefore, for the period 1988-2020, 200 LGV trips per day were considered to have travelled to and from the Application Site for 252 workdays. For the period 2013-2020, 50 LGV trips per day were considered to have travelled to and from the Application Site for 252 workdays.

A total of 1,360,800 LGV traffic movements were generated by staff from 1988 to June 2020 which equates to an annual average of 41,236 LGV movements or a daily average of 164 traffic movements. These figures all reflect 2 journeys- to and from the Application Site for all personnel (permanent and seasonal) each travelling by an LGV for the full working year.

The overall total of HGV and LGV traffic movements combined average 46,674 annual movements or 185 daily movements for the Peat Extraction Phase.

Other Vehicular Movements

Further vehicular movements to and from the Application Site associated with activities such as construction work, fuel deliveries, general collections and general deliveries would have taken place as required. Similarly, approximately 5 no. staff personnel have been continuously employed by the Applicant to undertake environmental monitoring of the Applicant's sites which have been operating under IPC Licence. Accordingly, vehicular movements associated staff undertaking environmental monitoring would also have been generated through the year. These traffic movements are not considered significant when viewed in comparison to the number of movements associated with peat extraction deliveries and staff movements to and from the Application Site. As such, they are not identified in the table below. Furthermore, this is considered within the context that the traffic movements estimated for the Peat Extraction Phase vehicles have been identified on a highly conservative precautionary basis.

Table 14-1 Traffic Movements during the Peat Extraction Phase

Peat Extraction Phase 1988 to June 2020							
Year	Annual Extracted Tonnes of peat	HGV Average HGV Movements Based on a 252 day work year	HGV Average daily HGV Movements Based on a 252 day work year	LGV Estimated Staff Movements Based on a 252 day work year	LGV Average daily LGV Movements Based on a 252 day work year	HGV & LGV Total HGV and LGV Movements Based on a 252 day work year	HGV and LGV Average daily Movements Based on a 252 day work year
1988[2]	66,514	5,116	20	50,400	200	55,516	220
1989	117,755	9,058	36	50,400	200	59,458	236
1990	90,583	6,968	28	50,400	200	57,368	228
1991	86,190	6,630	26	50,400	200	57,030	226
1992	92,744	7,134	28	50,400	200	57,534	228
1993	104,742	8,057	32	50,400	200	58,457	232
1994	110,074	8,467	34	50,400	200	58,867	234
1995	104,384	8,030	32	50,400	200	58,430	232
1996	111,260	8,558	34	50,400	200	58,958	234
1997	97,800	7,523	30	50,400	200	57,923	230

[2] *Whilst the Peat Extraction Phase commenced in July 1988, in order to present a precautionary scenario, the total volume of peat extracted for the full year is used to quantify traffic movements*

Peat Extraction Phase 1988 to June 2020							
Year	Annual Extracted Tonnes of peat	HGV Average HGV Movements Based on a 252 day work year	HGV Average daily HGV Movements Based on a 252 day work year	LGV Estimated Staff Movements Based on a 252 day work year	LGV Average daily LGV Movements Based on a 252 day work year	HGV & LGV Total HGV and LGV Movements Based on a 252 day work year	HGV and LGV Average daily Movements Based on a 252 day work year
1998	102,495	7,884	31	50,400	200	58,284	231
1999	86,749	6,673	26	50,400	200	57,073	226
2000	98,702	7,592	30	50,400	200	57,992	230
2001	98,702	7,592	30	50,400	200	57,992	230
2002	28,640	2,203	9	50,400	200	52,603	209
2003	59,737	4,595	18	50,400	200	54,995	218
2004	48,956	3,766	15	50,400	200	54,166	215
2005	59,251	4,558	18	50,400	200	54,958	218
2006	68,069	5,236	21	50,400	200	55,636	221
2007	47,637	3,664	15	50,400	200	54,064	215
2008	51,829	3,987	16	50,400	200	54,387	216
2009	27,721	2,132	8	50,400	200	52,532	208

Peat Extraction Phase 1988 to June 2020							
Year	Annual Extracted Tonnes of peat	HGV Average HGV Movements Based on a 252 day work year	HGV Average daily HGV Movements Based on a 252 day work year	LGV Estimated Staff Movements Based on a 252 day work year	LGV Average daily LGV Movements Based on a 252 day work year	HGV & LGV Total HGV and LGV Movements Based on a 252 day work year	HGV and LGV Average daily Movements Based on a 252 day work year
2010	81,062	6,236	25	50,400	200	56,636	225
2011	64,951	4,996	20	50,400	200	55,396	220
2012	17,095	1,315	5	50,400	200	51,715	205
2013	108,605	8,354	33	12,600	50	20,954	83
2014	77,968	5,998	24	12,600	50	18,598	74
2015	62,267	4,790	19	12,600	50	17,390	69
2016	39,730	3,056	12	12,600	50	15,656	62
2017	51,844	3,988	16	12,600	50	16,588	66
2018	89,839	6,911	27	12,600	50	19,511	77
2019	42,115	3,240	13	12,600	50	15,840	63

Peat Extraction Phase 1988 to June 2020							
Year	Annual Extracted Tonnes of peat	HGV Average HGV Movements Based on a 252 day work year	HGV Average daily HGV Movements Based on a 252 day work year	LGV Estimated Staff Movements Based on a 252 day work year	LGV Average daily LGV Movements Based on a 252 day work year	HGV & LGV Total HGV and LGV Movements Based on a 252 day work year	HGV and LGV Average daily Movements Based on a 252 day work year
2020 (6 months from Jan 2020 to Jun 2020)	18,891[3]	1,453	6	6,300	25	7,753	31
Peat Extraction Phase 1988- June 2020	2,414,901 Total peat volumes extracted (tonnes)	185,760 Total HGV movements	22 Average daily HGV movements	1,354,500 Total LGV movements	163 Average daily LGV movements	1,540,260 Total HGV and LGV movements	185 Average daily HGV and LGV movements
	Average Annual HGV Movements only		**5,629**	**Average Annual LGV Movements only**			**41,045**

[3] *Whilst peat extraction ceased on the Application Site in June 2020, for the purposes of quantifying transport movements associated with HGV movements delivering the extracted peat during both the Peat Extraction Phase (July 1988 to June 2020) and the Current Phase (June 2020 to present day), the total peat extraction volume for the year 2020 is divided evenly over the course of the year into two 6-month blocks. For the Peat Extraction Phase, a total volume for January 2020 to June 2020 is identified (i.e half of the annual total) and for the Current Phase, a total volume for July 2020 to December 2020 is identified (i.e half of the annual total).*

14.2.4.2 Current Phase June 2020 to present day

Traffic movements to and from the Application Site during the Current Phase can be found in Table 14-2 below.

Peat Extraction

Peat extraction ceased at the Application Site in June 2020. Following cessation, peat which had already been extracted was consolidated into stockpiles, before it was transported from the Application Site to Kilberry Works, Edenderry Power Station and Derrinlough Briquette Factory, albeit at a reduced delivery rate than during the Peat Extraction Phase.

From June 2020 onwards, it is assumed that 18,891 tonnes of stockpiled peat were delivered to Kilberry Works, Edenderry Power Station and Derrinlough Briquette Factory over 726 deliveries (1,453 traffic movements).

At the start of 2021, 22,289 tonnes of stockpiled peat remained on the Application Site. By the end of that year, 15,493 tonnes were delivered to Kilberry Works, Edenderry Power Station and Derrinlough Briquette Factory over 596 deliveries (1,192 traffic movements).

By the end of 2022, 9,514 tonnes of stockpiled peat were delivered to Kilberry Works, Edenderry Power Station and Derrinlough Briquette Factory over 366 deliveries (731 traffic movements).

By the end of 2023, the remaining peat stockpiles totalling 8,528 tonnes, were delivered to Kilberry Works, Edenderry Power Station and Derrinlough Briquette Factory over 328 deliveries (656 traffic movements).

Thus, the total estimated HGV movements for the Current Phase is 4,032 from the end of June 2020 to the end of 2023, or an average of 806 movements per year or 4 HGV movements per day (based on a 252 workday, as transportation and monitoring are not seasonal like extraction).

Personnel Traffic Movements

The Applicant employed 2 No. permanent staff and 4 No. seasonal staff to facilitate the removal of stockpiled peat off the bogs for transportation to Kilberry Works, Edenderry Power Station and Derrinlough Briquette factory, until the last of the stockpiles were removed by the end of 2023.

Using the precautionary principle, personnel traffic movements calculated in Table 14-2 considers the following:

- From the period 2020-2023, it is assumed all 6 personnel (2 permanent and 4 seasonal) travelled to and from the Application Site throughout the year (i.e for 252 days a year). As detailed above, seasonal personnel would only travel for 6 months a year, but for the purposes of this assessment and to present a highly conservative precautionary scenario, it is assumed that the seasonal staff travelled all year round.
- From the period 2024-present, it is assumed all 6 personnel (2 permanent and 4 seasonal) have travelled and will travel to and from the Application Site throughout the year (i.e for 252 days a year). As detailed above, seasonal personnel would only travel for 6 months a year, but for the purposes of this assessment and to present a highly conservative precautionary scenario, it is assumed that the seasonal staff travelled all year round.
- Using the precautionary principle, it is assumed that 1 personnel member travelled per LGV to and from local towns, villages and rural settlements to the Application Site.

Therefore, for the period 2020 to present, 6 vehicles per day were considered to have travelled to the Application Site each day for 252 workdays. It is assumed that each vehicle took two trips per day i.e to and from the Application Site. Therefore, 12 LGV trips per day were considered to have travelled to and from the Application Site for 252 workdays.

Please see Chapter 4 Description for more details on the Current Phase activities. Please see Table 14-2 for the estimated annual traffic movements generated during the Current Phase.

The overall total of HGV and LGV traffic movements combined up to the end of 2023 when the last of the stockpiles were removed is estimated to be 19,404 annual movements or 19 daily movements based on a 252-day work year.

Due to the removal of all remaining stockpiles of peat on the Application Site, there are no HGV traffic movements identified for the year 2024 to present day. Therefore, the overall total of LGV traffic movements for 2024 to present day is estimated to be 3,024 annual movements or 12 daily movements based on a 252-day work year.

Table 14-2 Traffic Movements during the Current Phase

Current Phase: June 2020 to present							
Year	**Stockpiled Peat Delivered**	**HGV** Average HGV Movements Based on a 252 day work year	**HGV** Average daily HGV Movements Based on a 252 day work year	**LGV** Estimated Staff Movements Based on a 252 day work year	**LGV** Average daily LGV Movements Based on a 252 day work year	**HGV & LGV** Total HGV and LGV Movements Based on a 252 day work year	**HGV and LGV** Average Daily Movements Based on a 252 day work year
2020 (6 months from Jul 2020 to Dec 2020)[4]	18,891	1,453	6	6,300	25	7,753	31
2021	15,493	1,192	5	3,024	12	4,216	17
2022	9,514	731	3	3,024	12	3,755	15
2023	8,528	656	3	3,024	12	3,680	15
Total movements during Current Phase 2021-2023	52,246 tonnes removed	4,032 Total HGV movements	4 average daily HGV movements	15,372 Total LGV movements	15 average daily LGV movements	19,404 Total LGV and HGV movements	19 average daily HGV and LGV movements
	Average Annual HGV Movements only		**806**	**Average Annual LGV Movements only**			**3,843**
2024 to present [5]	N/A	N/A	N/A	3,024* estimated	12* estimated	3,024 LGV Only* estimated	12 LGV Only* estimated

[4] *Whilst peat extraction ceased on the Application Site in June 2020, for the purposes of quantifying transport movements associated with HGV movements delivering the extracted peat during both the Peat Extraction Phase (1988 to June 2020) and the Current Phase (June 2020 to present day), the total peat extraction volume for the year 2020 is divided evenly over the course of the year into two 6 month blocks. For the Peat Extraction Phase, a total volume for January 2020 to June 2020 is identified (i.e half of the annual total) and for the Current Phase, a total volume for July 2020 to December 2020 is identified (i.e half of the annual total).*

[5] *Under a precautionary scenario, a full year is assumed for 2024 to present day.*

14.2.4.3 Remedial Measures Phase

Traffic movements to and from the Application Site during the Remedial Phase can be found in Table 14-3 below.

It is a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence (Reg. P0501-01) that the Applicant, prepare (to the satisfaction of the EPA) and implements a Cutaway Bog Decommissioning and Rehabilitation Plan for each bog. The plans set out the Applicant's proposal for each bog to facilitate and enhance peatland rehabilitation in order to bring about environmental stabilisation across the Application Site. The Applicant have produced a Cutaway Bog Decommissioning and Rehabilitation and Plan for all 5 no. bogs of the Application Site, and it is the intention of the Applicant to rehabilitate the bogs in a phased approach under IPC Licence. Please see Appendix 4-2 for details.

The Remedial Phase actions are divided into short- and long-term planning actions. As part of the short-term planning actions (0-2 years), the Applicant will undertake site wide ecological surveys, a drainage management assessment, implement drainage blocking and continue with environmental monitoring as outlined in the IPC Licence for the Application Site. These works will require 1-2 excavators and tractors at each bog per day and 1-2 personnel vehicles on site per day for the 2-year period. The tractors and excavators will be stored at the Ballivor Works (adjacent to the Application Site) at the end of the workday; they will not utilise the public road network except when crossing the road (2 movements per day) to access other bogs. The long-term phase (year 3 onwards) will entail 1-2 LGVs on site per month to evaluate the success of the plans and monitor silt ponds. Please see Chapter 4 Description for more details on the Remedial Phase activities.

For the purposes of estimating traffic generation from the above activities, 2 personnel vehicles per workday (2 vehicles on site for 252 days per year) are considered for the first 2 years and then 12 personnel vehicles per year are considered for the long-term phase over a period of 27 years. Thus, there are no HGV traffic movements anticipated for the Remedial Phase.

The overall total of LGV traffic movements for the first 2 years of the Remedial Phase is estimated to be 4,302 movements or 4 daily movements based on a 252-day work year. The overall total of LGV traffic movements for the following 27-years of the Remedial Phase is estimated to be 648 movements or 24 annual traffic movements which equates to approximately 2 per month based on a 252-day work year.

Table 14-3 Traffic Movements for the Remedial Phase

Remedial Phase				
Year	**Total HGV Movements per year**	**Average annual LGV Movements**	**Total LGV Movements over time-period**	**Average daily LGV Movements**
Year 1 and Year 2 (short term action plan)	0	2,016	4,032	4
Year 3 to year 30	0	24	648	Less than 1 per day
Total at the end of the Remedial Phase	0	1,020 Average annual Movements over 30-year period	4,680 Total LGV movements over 30-year period	Less than 1 per day

14.2.4.4 Traffic volumes generated from the Application Site in comparison to Average Annual Daily Traffic Count Data

Table 14-1 to Table 14-3 above sets out the traffic movements to and from the Application Site during the Peat Extraction Phase, Current Phase and Remedial Phase.

Table 14-4 below sets out the impact that the traffic movements generated during all three Project phases had or will have on the surrounding road networks using traffic count data from the TII website.

As detailed in Section 14.2.3, peat extracted on the Application Site was transported to the Works via internal rail, and from Ballivor Works to one of a range of end destinations including Rhode ESB Power Station, Kilberry Works, Cúil na Móna Works, Croghan Briquette Factory, and from Ballivor Works to the horticulture industry overseas via Dublin Port. The exact end destinations and haul routes are uncertain, along with commuting routes for staff personnel. Using the precautionary principle, 4 TII count locations were identified in as close to a North-East-South-West direction surrounding the Application Site. The purpose of identifying 4 proximate TII count locations at the Application Site is to identify Average Annual Daily Traffic (AADT) data for the Application Site's surrounding road network

The representative TII Count Locations selected are identified below and presented in Figure 14-1:

- **North of the Application Site:** TII Count Station TMU N52 080.0 W. Located on the N52 between Delvin and Mullingar, Delvin, Co. Westmeath. Earliest year that count data was collected: 2020
- **East of the Application Site**: TII Count Station TMU N51 040.0 E. Located on the N51 Between Athboy and Navan, Rathmore, Co. Meath. Earliest year that count data was collected: 2020.
- **South of the Application Site**: TII Count Station TMU R148 040.0 W. Located on the R148 east of Kinnegad, Ardnamullen, Co. Meath. Earliest year that count data was collected: 2020.
- **West of the Application Site**: TII Count Station TMU N52 100.0 W. Located on the N52 Between Mullingar and Tyrrellspass, Marlinstown, Co. Westmeath

The earliest count data available at all four locations is for the year 2020. For all four locations the AADT is lowest for the year 2020 when compared to 2021, 2022 and 2024 data. For the earliest year in the Peat Extraction Phase, 1988, it is considered that AADT values would have been lower than the 2020 AADT values, however, AADT count data for 1988 is unavailable. In order to estimate an AADT value that would be more representative of 1988, Census population data presented in Section 5.4 of this rEIAR has been utilised. The population of the State increased by 31% from the year 1986 (Census Year) to 2022 (Census Year), and so, in order to present a precautionary scenario and align AADT data with the population at the time, TII AADT count data for 2020 has been reduced by 31%, and a theoretical 1988 AADT Count has been deduced.

The TII AADT data for the year 2020 is based on counts taken during a period of Covid-19 related government travel restrictions which would have resulted in an even lower level of daily traffic volumes. As this data is being used to infer a theoretical 1988 value for reduced traffic movements, the TII 2020 data has not been adjusted relative to Covid-19. This is to infer a theoretical precautionary scenario as Table 14-4 below presents the Project's traffic movements as a percentage of the lowest recorded daily traffic count. Similarly, the TII 2020 data has been utilised for the Current Phase and Remedial Phase as it is the lowest possible TII AADT recorded, and as such, presents a precautionary scenario.

It should be noted that the average daily Project traffic movements (e.g., 185 daily HGV and LGV movements during the Peat Extraction Phase) leaving the Application Site would have travelled in various directions; however, as a conservative measure, Table 14-4 below calculates the impact of traffic movements associated with the Project as if all traffic movements were towards the same destination, i.e.

185 HGV and LGV movements are compared with the average annual daily traffic count on each available route. Therefore, the results below identify a much greater impact that would have occurred in reality.

The available TII traffic count data also includes a percentage of the daily recorded traffic which corresponds to HGVs. The Project's peat delivery movements are also represented as a percentage of the lowest recorded daily traffic count. As can be seen, the Application Site generated HGVs during the Peat Extraction Phase and the Current Phases are at a much lower percentage than the average daily percent of HGVs that use these roads. Likewise, the average daily HGV and LGV traffic generated by the Application Site in all phases is much lower than the lowest, available, average daily traffic counted on these roads.

Table 14-4 Traffic movements generated by the Project in comparison with TII recorded daily averages along assumed chosen routes.

Representative Count Station and Location	AADT Data Year: 1988 [6]	TII % of AADT which was HGV	Extraction Phase: 1988 to June 2020				Current Phase: June 2020 to present day					Remedial Phase	
			The Project's average Daily Traffic from 1988 to June 2020 (LGV and HGV combined)	The Project's average daily traffic movement as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	TII AADT Data Year: 2020[7]	The Project's average Daily Traffic (LGV and HGV combined)	The Project's average daily traffic movements as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	The Project's average daily LGV traffic movements	The Project's average Daily traffic movements as % of lowest available ADDT
North of the Application Site: TMU N52 080.0 W N52 Between Delvin and Mullingar, Delvin, Co. Westmeath Data Year: 2020	3,049	10.9%	185	6%	22	0.7%	4,312	19	0.4%	4	<0.1%	0.1	<0.1%

[6] For the Peat Extraction Phase, a theoretical 1988 AADT value has been quantified using Census population data for the State. The 31% reduction in State population between Census years 1986 and 2021 was also applied to the earliest TII Count data available i.e 2020.
7 TII 2020 Count Data

Representative Count Station and Location	AADT Data Year: 1988 [6]	TII % of AADT which was HGV	Extraction Phase: 1988 to June 2020				Current Phase: June 2020 to present day					Remedial Phase	
			The Project's average Daily Traffic from 1988 to June 2020 (LGV and HGV combined)	The Project's average daily traffic movement as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	TII AADT Data Year: 2020[7]	The Project's average Daily Traffic (LGV and HGV combined)	The Project's average daily traffic movements as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	The Project's average daily LGV traffic movements	The Project's average Daily traffic movements as % of lowest available ADDT
East of the Application Site (closest count location is north-east): TMU N51 040.0 E N51 Between Athboy and Navan, Rathmore, Co. Meath Data Year: 2020	2,710	3.7%	185	7%	22	0.8%	3,832	19	0.5%	4	<0.1%	0.1	<0.1%

Representative Count Station and Location	AADT Data Year: 1988 [6]	TII % of AADT which was HGV	Extraction Phase: 1988 to June 2020				Current Phase: June 2020 to present day					Remedial Phase	
			The Project's average Daily Traffic from 1988 to June 2020 (LGV and HGV combined)	The Project's average daily traffic movement as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	TII AADT Data Year: 2020[7]	The Project's average Daily Traffic (LGV and HGV combined)	The Project's average daily traffic movements as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	The Project's average daily LGV traffic movements	The Project's average Daily traffic movements as % of lowest available ADDT
South of the Application Site: TMU R148 040.0 W R148 East of Kinnegad, Ardnamullen, Co. Meath Data Year: 2020	5,093	9.7%	185	4%	22	0.4%	7,202	19	0.3%	4	<0.1%	0.1	<0.1%

Representative Count Station and Location	AADT Data Year: 1988 [6]	TII % of AADT which was HGV	Extraction Phase: 1988 to June 2020				Current Phase: June 2020 to present day					Remedial Phase	
			The Project's average Daily Traffic from 1988 to June 2020 (LGV and HGV combined)	The Project's average daily traffic movement as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	TII AADT Data Year: 2020[7]	The Project's average Daily Traffic (LGV and HGV combined)	The Project's average daily traffic movements as % of lowest available ADDT (LGV and HGV combined)	The Project's average daily HGV movements	The Project's average daily HGV as a % of lowest available ADDT	The Project's average daily LGV traffic movements	The Project's average Daily traffic movements as % of lowest available ADDT
West of the Application Site: TMU N52 100.0 W N52 Between Mullingar and Tyrrellspass, Marlinstown, Co. Westmeath Data Year: 2020	3,956	10.0%	185	5%	22	0.6%	5,595	19	0.3%	4	<0.1%	0.1	<0.1%

14.2.5 Assessment of Significant Effects and Mitigation Measures

14.2.5.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities and all ancillary works commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to the Applicant in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of the Applicant's

statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of the Applicant's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

14.2.5.2 Peat Extraction Phase: July 1988 to June 2020

Identification of Impact

Peat extraction activities and all ancillary works at the Application Site resulted in the concentration of daily personnel LGVs traffic movements to the Application Site in the mornings and from the Application Site in the evenings, particularly during the peat extraction season of April to September. It is estimated that an average of 163 staff personnel LGV movements were made to and from the Application Site each day.

The daily deliveries of peat out of the Application Site and subsequent return of empty vehicles resulted in a concentration of HGV movements to and from the Application Site during off peak times. An average of 26 tonnes of peat were transported per delivery and it is estimated that an average of 22 HGV movements were made to and from the Application Site each day.

The daily average of HGV and LGV traffic movements combined generated by the Application Site is 185 movements.

In comparison to the average annual daily traffic count and average annual daily HGV count for the theoretical Year 1988 along the Application Site surrounding road network, the traffic numbers generated by the Application Site are considerably lower than the daily average. The average annual LGV and HGV traffic movements generated by the Project contributed to a range of 3 - 7% of the AADT (Year 1988) for the four representative TII count locations.

The average annual HGV traffic generated by the Project contributed to a range of 0.3 - 0.5% of daily traffic volumes on representative roads and makes up approximately 3% to 16% of the HGV share of traffic volumes on representative roads (Year 1988).

Peat extraction ceased in Lisclogher Bog in 2003 and therefore the railway crossing between this bog and Bracklin went out of use. Locomotives would have crossed the R156 an average of two times per day during the Peat Extraction Phase. Given the low frequency of crossings and the presence of gates and sensory notification lighting, the impact on road users is not considered significant.

Further vehicular movements to and from the Application Site associated with activities such as construction work, fuel deliveries, general collections and general deliveries would have taken place as required. Similarly, approximately 5 no. staff personnel have been continuously employed by the Applicant to undertake environmental monitoring of Bord na Móna sites which have been operating under IPC Licence. Accordingly, vehicular movements associated staff undertaking environmental monitoring would also have been generated through the year. These traffic movements are not considered significant when viewed in comparison to the number of movements associated with peat extraction deliveries and staff movements to and from the Application Site. As such, they are not identified in the data results above. Furthermore, this is considered within the context that the traffic

movements estimated for the peat extraction phase vehicles have been identified on a highly conservative precautionary basis.

Control Measures

- Peat deliveries from the Application Site out to various destinations were carried out during off-peak times only.
- All transport HGVs underwent regular inspection and maintenance checks.
- All transport HGVs underwent wheel washing prior to leaving the Application Site to minimise the soiling of local roads.
- Only HGV licence holders operated the peat delivery vehicles and underwent regular re-training on HGV safety operations and vehicle maintenance.
- Refuelling of all HGV vehicles was undertaken at the Ballivor Works or by using bunded mobile refuelling units on site where required.
- Dust suppression measures were used when transporting peat loads to end users. Peat loads were secured with polythene film gauge sheets to prevent dust emissions to the atmosphere during transportation. (By c. 2008, fully enclosed bed trailers were used so dust generation from peat loads in transport was no longer an issue)
- Machinery crossing points on local roads between bogs were cleaned down at the end of each working day
- Two railway level crossing points at local roads were established by the Applicant at the Application Site. The railway locomotives underwent continuous inspection and maintenance to prevent fires, accidents, fuel leaks and de-railments within the bogs and at the level crossings locations. Catch points were also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trans before reaching the level crossing.
- The locomotives were fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Wagons were also designate as fire safety wagons and were stocked with various fire safety paraphernalia including hoses, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers.

Residual Effect

The traffic generated to and from the Application Site during the Peat Extraction Phase from 1988 to June 2020 is considered to have had a negative imperceptible effect on traffic volumes, roads and road users.

Impacts on road users due to the presence of level crossings to facilitate Bord na Móna locomotive movements to and from bogs within the Application Site is considered to have had a negative slight effect on traffic volumes, roads and road users.

Significance of Effects

The effects of the Peat Extraction Phase activities on traffic and transport from 1988 to June 2020 are considered not significant.

14.2.5.3 Current Phase: June 2020 to Present Day

Identification of Impact

Peat extraction ceased at the Application Site in June 2020. Traffic generated during the Current Phase comprised the removal of stockpiled peat at the Application Site to Kilberry Works, Edenderry Power

Station and Derrinlough Briquette Factory, and staff personnel vehicles travelling to and from the Application Site. Stockpile removal was completed in 2023.

The daily movements of peat out of the Application Site and subsequent return of empty vehicles resulted in a concentration of HGV movements to and from the Application Site during off peak times. An average of 26 tonnes of peat were transported per delivery and it is estimated that an average of 4 HGV movements were made to and from the Application Site each day. It is estimated that an average of 15 LGV staff movements were made, during the removal of stockpiled material, to and from the Application Site each day.

The daily average of HGV and LGV traffic movements combined generated by the Application Site is 19 movements. This is considered to be conservative as vehicle movements to and from the Application Site reduced once the final volumes of stockpiled material were removed.

In comparison to the average annual daily traffic count and average annual daily HGV count reported by TII for the year 2020 along the Application Site surrounding road network, the traffic numbers generated by the Application Site are considerably lower than the daily average. The average annual LGV and HGV traffic movements generated by the Project contributed to 0.3 – 0.4% of the AADT (Year 2020) for the representative TII count locations.

The average annual HGV traffic generated by the Project contributed to less than 0.1% of daily traffic volumes on representative roads.

Control Measures

Control measures undertaken during the Current Phase are the same as those undertaken in the Peat Extraction Phase, as detailed in Section 14.2.5.2 above. In addition, as part of the Applicant's vision for a climate neutral Ireland by 2050, the Applicant encourages and promotes car sharing and cycle to work schemes where possible for its staff personnel. Therefore, there giving rise to the potential to reduce the daily LGV numbers travelling to and from at the Application Site.

Residual Effect

The traffic generated to and from the Application Site during the Current Phase is considered to have had a negative, short term, imperceptible effect on traffic volumes, roads and road users.

Significance of Effects

The effects of the Current Phase activities on traffic and transport are considered not significant.

14.2.5.4 Remedial Phase

Identification of Impact

During the Remedial Measures Phase, ecologists, engineers and site operatives will oversee and undertake the process of rehabilitation including drain blocking which requires 1-2 HGVs per bog for the first 2 years of the Remedial Phase. These HGVs will not utilise the public road network; they will cross the road once in the morning and once in the evening to track back to the Works where they will be stored but will not contribute to traffic flow numbers. It is estimated that 1-2 LGV s will travel to and from the Application Site each day for the first two years. After that, just 1-2 LGV vehicles will be required to visit the Application Site each month to inspect the progress of the remedial measures.

In comparison to the average annual daily traffic count data reported by TII along representative roads the LGV numbers generated by the Application Site for this phase are considerably lower than the

daily average annual traffic count numbers. It is estimated that the LGV traffic generated by the Application Site for this phase will contribute to less than 0.1% of daily traffic volumes on representative roads.

Infrequent rail movements associated with maintenance works of the rail line will take place during this phase.

Mitigation Measures

- All HGVs used on site will undergo regular inspection and maintenance checks.
- All HGVs used on site will undergo wheel washing prior to crossing the local road network to access other bogs or return to the Ballivor Works for storage.
- Only HGV licence holders operated the HGVs and will undergo regular re-training on HGV safety operations and vehicle maintenance.
- Refuelling of all HGV vehicles was undertaken at the Ballivor Works only.
- Machinery crossing points on local roads between bogs were cleaned down at the end of each working day.
- Car sharing by personnel and bike to work schemes will be encouraged. As part of the Applicant's vision for a climate neutral Ireland by 2050, the applicant encourages and promotes car sharing and cycle to work schemes where possible for its personnel.

Residual Effect

The estimated traffic levels generated to and from the Application Site during the Remedial Measures Phase is considered to have had a negative, short term, imperceptible effect on traffic volumes, roads and road users.

Significance of Effects

The effects of the Remedial Measures Phase activities on traffic and transport are considered not significant.

14.2.6 Cumulative and In-Combination Effects

Given that during the Peat Extraction Phase, peat extraction activities and all ancillary works was underway across all bogs at the Application Site except Lisclogher West, it is considered that traffic movements that took place between 1953 and 1988 (i.e. between the commencement of peat extraction and before the EIA Directive was required to be transposed into Irish law), would have been less than during the Peat Extraction Phase as extraction was underway at Ballivor, Bracklin (southern section), Carranstown (eastern section) and Lisclogher (eastern section) only. The potential cumulative effect of the peat extraction activities and all ancillary works that took place prior to 1988 with the Project are considered to have had a negative, short term, imperceptible effect on traffic volumes, roads and road users.

It is intended to utilise the Application Site for both peatland remediation (rehabilitation) and wind energy infrastructure, to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits.

As such, Cutaway Bog Decommissioning and Rehabilitation Plans are assessed as part of the planning application for this Project. As detailed in Section 14.2.5.4, the potential effect of the Remedial Phase of the Project on traffic and transport is considered a short-term, imperceptible negative effect. There is a potential for increased traffic movements associated with the implementation of the Peatland Climate Action Scheme (PCAS) on certain parts of the Application Site, however, however, there is no potential

for cumulative effects on traffic and transport as the PCAS will be completed in place of with the rehabilitation works identified in the Remedial Phase. The environmental impact assessment for the proposed Ballivor Wind Farm application includes an assessment of the implementation of the rehabilitation plans in conjunction with the construction, operation and decommissioning of the wind farm. The overall footprint of the proposed Ballivor wind farm will be less than 3% of the total area of the Application Site, and therefore will 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 effect of the construction, operational and decommissioning phases of the proposed Ballivor Wind Farm in combination with the Remedial Phase of the Project is not considered to be significant, given the nature of the Remedial Phase works. As such the potential cumulative effect of the Project with the proposed Ballivor Wind Farm is considered to be a potential slight, negative, short term, effect on traffic volumes, roads and road users.

Furthermore, cumulative effects when considering the consented Bracklyn Wind Farm (Planning Ref: 311565) and the proposed Knockanarragh Wind Farm located approx. 6km to the north) and any other proposed, permitted or operational plans or projects listed in Chapter 2 of this rEIAR are considered not significant given the nature of the Remedial Phase works.

14.3 Other Material Assets

14.3.1 Introduction

14.3.1.1 Background and Objectives

The purpose of this section is to assess the effects of the Project on material assets such as telecoms, aviation, utilities and waste management.

14.3.1.2 Guidance and Legislation

This section of the rEIAR has been completed in accordance with the guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely significant effects associated with peat extraction activities and all ancillary works at the Application Site. Further information on the classification of effects used in this assessment is presented in Section 1.7.2 of this rEIAR.

14.3.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Section 2.6 of Chapter 2 of the rEIAR.

Uisce Eireann

A scoping request was issued to Uisce Eireann (formerly known as Irish Water) on the 2nd of December 2021 and again on the 27th of June 2022. An acknowledgement of the request was issued on the same date. A recent scoping request was sent to Uisce Eireann 14th February 2024, and a response was received on the 20th of March 2024. A summary of the response is provided in Chapter 2 Section 2.6 of this rEIAR, and a copy of the response is provided in Appendix 2-1.

Uisce Éireann highlight key considerations for Water Services in Environmental Impact Assessments (EIAs). These include measures to protect Drinking Water Sources, waste sampling for backfilling materials, mitigations for negative impacts on water sources, assessments of impacts on nearby reservoirs and water services capacity, and considerations for connecting to Uisce Éireann networks.

Waterways Ireland

A scoping request was sent to Waterways Ireland on the 2nd of December 2021. and on the 27th of June 2022. No response was received.

A scoping request was sent to Waterways Ireland on the 14th February 2024. A response was received on the 15th February 2024 confirming that the Application Site is not within any Zone of Influence of their waterways and therefore they will not be commenting.

Department of the Environment, Climate and Communications

A scoping request was sent to the Department of the Environment, Climate and Communications (DECC) the 2nd of December 2021. A response was received from the DECC via the EPA on the 17th of December 2021 and again on the 14th of February 2024. The response comprised a list of relevant data sources and websites relating to geological mapping, geohazards, groundwater and thermal data for the country. Please see Appendix 2-1 for scoping correspondences with consultees in relation to this application.

ESB

A scoping request was sent to the ESB on the 27th of June 2022. A scoping request was sent to the ESB on the 14th of February 2024. No response was received.

Eirgrid

A scoping request was sent to Eirgrid on the 27th of June 2022 and the 14th February 2024. No response was received.

14.3.2 Methodology

The EPA Guidelines on the information to be contained in EIARs (2022) states that material assets are taken to mean built services and infrastructure, roads and traffic and waste management. This section of the assessment focuses on those material assets other than traffic, which has been assessed in Section 14.2. This section assesses built services and infrastructure which have not already been addressed elsewhere in this rEIAR. The potential impacts on built services and infrastructure, if any, are assessed in terms of the following:

- Electricity;
- Gas Supply;
- Water Supply;
- Surface Water Infrastructure;
- Wastewater;
- Waste Management; and,
- Telecommunications and Aviation.

This section of the assessment provides a review of the material assets located within the Application Site and immediate surrounds which may have been impacted by the activities undertaken at the Application Site during the Peat Extraction Phase, Current Phase and Remedial Phase.

Scoping was carried out in line with the recommendations set out in May 2022 *Guidelines on the information to be contained in Environmental Impact Assessment Report*. A full description of the scoping and consultation exercise is provided in Section 2.6 of Chapter 2 of this EIAR. The assessment of likely significant effects on material assets uses the standard methodology and classification of impacts as presented in Section 1.7.2 of Chapter 1 of this rEIAR.

14.3.2.1 Annual Environmental Reports

Annual Environmental Reports (AERs) have been produced by the Applicant and submitted to the EPA annually since 2000 when Application Site began to operate under IPC Licence (Reg. P0501-01). AERs are submitted to the EPA by March 1st each year and include at minimum the information included in *Schedule 4 Recording and Reporting* to the Agency. The AERs include the amount of energy utilised, waste produced (type, reuse and disposal methods), and emissions for the whole Derrygreenagh Bog Group, which include, but are not specific to, the Application Site. Waste from the Allen Group is also included in these AER figures as Derrygreenagh was used as a waste collection point for all bog sites within the Derrygreenagh and Allen Bog Groups. Therefore, waste figures reported are higher than what was actually produced at the Application Site. AERs relating to IPC Licence P0501-01 are included in Appendix 4-3.

14.3.3 Establishment of Baseline (July 1988)

14.3.3.1 Electricity

It is unknown when a power supply was first established at the Application Site, but it is likely to have occurred simultaneously with the electrification of Ballivor Village in 1953-54, if not before.[8] Peat extraction equipment used on the Application Site that was electrically powered would have been energised via an internal electrical network which would have been actively in use on the Application Site. A reference to an existing power supply is included in a 1983 application for a bulk loading facility at the Works (Planning reference 83/382, located adjacent to the Application Site). Please see Chapter 4 Description of Development for details.

14.3.3.2 Gas Supply

A data request was sent to Gas Networks Ireland in April 2022. The data return concluded there are no gas pipelines within the Application Site, nor has there been a record of one.

14.3.3.3 Water Supply

There are no underground water networks within the Application Site, nor has there been a record of any. At the Works, which is located outside of the Application Site boundary, surface water drainage systems implemented as part of building and hardstand construction over the decades discharged into the adjacent Application Site peatlands surface water drainage network. Machine washings generated due to the cleaning of various plant machinery at both at the Application Site and at wash bays at the Works also drained into the adjacent Application Site peatlands drainage system.

Planning permission for a tea centre at the Works (adjacent to the Application Site) was granted in 1988. The building was connected to a pre-existing bored well water supply; however, there are no construction details available on this well. Please see Chapter 4 Description of Development for further details on the tea centre design.

14.3.3.4 Wastewater

There are no underground sewerage networks within the Application Site, nor has there been a record of any.

[8] *Rural electrification of Ballivor, Co Meath in 1954.* https://esbarchives.ie/2016/03/17/rural-electrification-of-ballivor-co-meath-in-1954/

Welfare facilities were provided for employees involved in peat extraction; however, site-specific details pertaining to the construction and design of welfare facilities when they were constructed pre-1988 for the Application Site are not available. Typical the Applicant's onsite welfare facilities included toilet facilities which served work and tea centres and were discharged into a septic tank. Final effluent from these treatment units typically discharged to ground.

14.3.3.5 Waste Management

Waste records do not exist for the Application Site for 1988. However, waste records do exist for the Peat Extraction Phase from 2000 onwards. Given that the activities ongoing at the Application Site during 1988 were the same as those which were ongoing during the Peat Extraction Phase, it is considered that the records of waste types which were generated for the Peat Extraction Phase (as per the AERs) are representative of the waste types generated at the 1988 baseline. Waste that would have been generated in July 1988 comprised the items listed below. The majority of these items were stored in a waste deposition area on the Application Site.

- Heavy and light fuels;
- Waste oils (lubricating oil, hydraulic oil) and brake fluids;
- Antifreeze;
- Scrap metal;
- Wet and dry batteries;
- General waste;
- Solvents;
- Oil filters;
- Paper and cardboard;
- Glass;
- Wood;
- Biodegradable kitchen and canteen waste;
- Workshop waste;
- Packaging waste;
- Waste plastic (primarily in the form of polythene sheeting); and,
- Boiler ash.

14.3.3.6 Telecommunications and Aviation

Radio Telefís Éireann established a TV transposer station (Planning Reference 702532) at Cairn Hill in Longford in 1970, and resultingly, a television link passes over the Application Site to a corresponding mast in the Dublin Mountains, a link which was present in July 1988. Peat extraction and related activities did not interact with TV and telecoms links which pass over the Application Site.

14.3.4 Peat Extraction Phase: July 1988 to June 2020

14.3.4.1 Electricity

14.3.4.1.1 *Grid Infrastructure*

The 110kV Mullingar to Corduff overhead 110kV transmission line traverses the Application Site in an east to west orientation at Carranstown Bog. Peat extraction was underway at Application Site prior to the installation of this line and extraction operations continued in this bog until June 2020 with no interference or impact on electricity services. Safety measures were and continue to be in place to ensure no physical interaction with peat extraction machinery and the line occurred.

14.3.4.1.2 *Rural Supply*

A planning application was granted permission by Westmeath Co. Council to construct a new 10/20kV substation at the Ballivor Works in 2005 (planning reference 05/2348, adjacent to the Application Site). The substation is located adjacent to an older substation. The floor area of the substation is 23.15m^2 and requires no water supply. The method of drainage for run off is via an open drain. The floor plan measures 3.5m by 6.615m and is 2.6m high. The building walls comprise a plaster finish. A condition of its grant of permission was that it was to be constructed as per ESB requirements. The substation is still currently operating.

14.3.4.2 Gas

A data request was sent to Gas Networks Ireland in April 2022. The data return concluded there are no gas pipelines within the Application Site.

14.3.4.3 Water Supply

There are no underground water networks within the Application Site.

As outlined above, planning permission for a Tea Centre at the Works (adjacent to the Application Site) was granted in 1988. The building was connected to a pre-existing bored well water supply; however, there are no construction details available on this well. Please see Chapter 4 Description of Development for further details on the tea centre design.

At the Works, which is located outside of the Application Site boundary, surface water drainage systems implemented as part of building and hardstand construction there over the decades discharged into the adjacent Application Site peatlands surface water drainage network at the Application Site. Machine washings generated due to the cleaning of various plant machinery at both at the Application Site and at wash bays at the Works also drained into the adjacent Application Site peatlands drainage system.

The nearest public water supply (PWS) is the Ballivor PWS within 3 km of the Application Site at its closest point. The Application Site is located more than 2km away at its closest point from the Source Protection Area (SPA) for the Ballivor PWS. The potential for the peat extraction activities and all ancillary works to impact the hydrogeology of the Ballivor PWS has been reduced as the bog drainage regime was already largely in place at the time the source boreholes were drilled (1994). The natural hydrological and hydrogeological regime of peat bogs, with little groundwater recharge and high runoff rates, also limit the potential effects that peat extraction activities and all ancillary works that may have had on local groundwater abstractions including the Ballivor PWS. The Application Site is not located within the mapped SPA area to the Ballivor PWS. Please see Chapter 8 Hydrology and Hydrogeology for further details.

14.3.4.4 Wastewater

There are no underground sewerage networks within the Application Site, nor has there been a record of any.

Welfare facilities were provided for employees involved in peat extraction; however, site-specific details pertaining to the construction and design of welfare facilities when they were constructed pre-1988 for the Application Site are not available. Typical the Applicant's onsite welfare facilities included toilet facilities which served work and tea centres and were discharged into a septic tank. Final effluent from these treatment units typically discharged to ground.

14.3.4.5 Waste Management

Waste that would have been generated in during the Peat Extraction Phase comprised the items listed below.

- Heavy and light fuels;
- Waste oils (lubricating oil, hydraulic oil) and brake fluids;
- Antifreeze;
- Scrap metal;
- Wet and dry batteries;
- General waste;
- Solvents;
- Oil filters;
- Paper and cardboard;
- Glass;
- Wood;
- Biodegradable kitchen and canteen waste;
- Workshop waste;
- Packaging waste;
- Waste plastic (primarily in the form of polythene sheeting); and,
- Boiler ash.

14.3.4.6 Telecommunications and Aviation

A telecoms scoping exercise was undertaken in February 2021 as part of the proposed Ballivor Wind Farm planning application (ABP Ref. PA25M.316212). Whilst this scoping exercise took place after the Peat Extraction Phase, the locations and status of telecommunications links, and the presence or lack of, fixed position masts at the Application Site provides an insight into what was present at the Application Site during the Peat Extraction Phase.

The scoping exercise concluded that there are no fixed position telecommunication masts within the Application Site. There are seven telecom operators with 11 no. links which traverse the Application Site as well as 1 no. Tetra Mast within 250m of the Application Site boundary.

The 11. no telecommunications links pass over and above the Application Site sending and receiving messages from one tower mast to another. These links could not be impacted by peat extraction activities and all ancillary works as these activities take place at ground level. The RTÉ 2rn link was established in 1970 and the remaining links were established from 1990 onwards with continuous retention permissions and upgrades over the years, thus demonstrating the viability of the telecommunications alongside the peat extraction industry. Peat extraction activities and all ancillary works have been in operation at the Application Site for decades prior the implementation of these telecommunication links and the Applicant's activities have and continue, to operate harmoniously with these communication assets for decades.

A scoping exercise for the proposed Ballivor Wind Farm was also undertaken with the Department of Defence and the Irish Aviation Authority (IAA). Neither statutory body indicated any potential assets in the area which may be impacted by past or proposed activities at the Application Site.

Please see scoping responses with telecommunication operators, the Department of Defence and the IAA pertaining to the proposed Ballivor Wind Farm in Appendix 14-1.

14.3.5 Current Phase: June 2020 to present day

14.3.5.1 Electricity, Gas, Water Supply, Wastewater, Telecommunications and Aviation

The material assets described in the Peat Extraction Phase under these headings are considered the same for the Current Phase. There have been no onsite changes or new applications for nearby links or

aviation assets in the surrounding landscape that could be impacted by the Current Phase at the Application Site.

14.3.5.2 Waste Management

Waste that is typically been generated in during the Current Phase comprises the items listed below.

- Heavy and light fuels;
- Waste oils (lubricating oil, hydraulic oil) and brake fluids;
- Antifreeze;
- Scrap metal;
- Wet and dry batteries;
- General waste;
- Solvents;
- Oil filters;
- Paper and cardboard;
- Glass;
- Wood;
- Biodegradable kitchen and canteen waste;
- Workshop waste;
- Packaging waste;
- Waste plastic (primarily in the form of polythene sheeting); and,
- Boiler ash.

All waste awaiting deposition is collected in a skip or appropriate waste receptacle at the Works prior to collection and transportation by a licensed waste collection contractor to a suitably licenced/permitted facility for offsite reuse/recycling/recovery/disposal as appropriate.

14.3.6 Remedial Phase

14.3.6.1 Electricity, Gas, Water Supply, Wastewater, Telecommunications and Aviation

These material assets described in the Peat Extraction Phase and Current Phase are considered the same for the Remedial Phase at the time of writing. The Remedial Measures Phase will comprise drainage blocking as part of the Cutaway Decommissioning and Rehabilitation Plans associated with Condition 10 of the IPC Licence (see Section 4.9.1 of Chapter 4 Description of Development for further detail) and routine environmental monitoring associated with the IPC Licence.

14.3.6.2 Waste Management

The Applicant has committed to continuing compliance with conditions outlined in the IPC Licence during the Remedial Phase, where applicable. Waste generated during the Remedial Measures Phase will be limited to general waste generated by the limited on-site staff, which will be transported off site by a licensed waste collection contractor and transported to a suitably licenced/permitted facility for offsite reuse/recycling/recovery/disposal as appropriate.

14.3.7 Assessment of Significant Effects and Mitigation Measures

14.3.7.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in section 3.2.1, peat extraction activities and all ancillary works commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to the Applicant in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland and this will be a permanent positive effect across a number of environmental receptors such as ecology and hydrology. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the "do nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of the Applicant's statutory obligations under IPC Licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of the Applicant's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

14.3.7.2 Peat Extraction Phase: July 1988 to June 2020

14.3.7.2.1 *Electricity*

Identification of Impact

The 110kV Mullingar to Corduff overhead 110kV transmission line traverses the Application Site in an east to west orientation at Carranstown Bog. Peat extraction was underway at this location prior to the installation of this line and extraction operations continued in this bog until June 2020 with no interference, impact or injury reported.

As described in Chapter 4, some peat extraction machinery used during the Project was powered by electricity from overhead lines associated with an internal electricity network. However, the transition to mostly diesel-powered machinery began in the 1980s, mitigating the reliance on the electrical network to power machinery. Nonetheless, for the purposes of this assessment, it is considered that peat extraction machinery was in part powered by the internal electrical network during the Peat Extraction Phase. Additionally, electricity was required to power the welfare facilities, offices, and railway crossing infrastructure. Drainage pumps which were located on the bogs (refer to Chapter 4 Description of Development) were powered by electricity.

AERs prepared on an annual basis in compliance with the conditions of IPC Licence P0501-01 provide total energy consumption figures for the Derrygreenagh Bog Group (of which the Ballivor Bog Group is a subset and within which the Application Site is located). There are no specific energy usage figures for the Application Site.

Control Measures

- When working near power lines, all of the Applicant's sites follow the measures detailed below:
  - *All staff are trained on the routes and operating voltages of overhead electricity lines running across or near Bord na Móna landholdings.*
  - *All staff must be trained to be aware of the risks associated with overhead lines.*
  - *All contractors that may visit the sites are made aware of the location of lines before they come on to site.*
  - *Information on safe clearances is provided to all staff and bog visitors.*
  - *The suitability of machinery and equipment for use near power lines is risk assessed.*
  - *Signage is erected in canteens and on site.*
  - *Goalposts, when used, should not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks*
  - *Barriers should run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.*
  - *On occasions when work must be carried out beneath overhead lines, a site-specific risk assessment is undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used is undertaken prior to*

any works. Overhead line proximity detection equipment is fitted to machinery when such works are required.

- Since 2005, all of the Applicant's operations are in full accordance with The Safety, Health and Welfare Act 2005.

Residual Effect

Peat extraction activities and all ancillary works on the ground have no impact or interactions on the quality or supply of electricity from overhead power lines. Safety at work measures were in place at the Application Site to ensure no physical interaction between machinery and the line occurred. Electricity demand for the Peat Extraction Phase is considered to have been relatively minor. Therefore, the residual effect on electricity supply during the Peat Extraction Phase is considered to be long term, not significant, and neutral.

Significance of Effects

Based on the assessment above there was no significant effect on electricity supply during the Peat Extraction Phase.

14.3.7.2.2 *Water Supply*

Identification of Impact

There are no underground water networks within the Application Site. Planning permission for a Tea Centre at the Works (adjacent to the Application Site) was granted in 1988. The building was connected to a pre-existing bored well water supply; however, there are no construction details available on this well. Please see Chapter 4 Description of Development for further details on the tea centre design.

The nearest public water supply (PWS) is the Ballivor PWS within 3 km of the Application Site at its closest point. The Application Site is located more than 2km away at its closest point from the Source Protection Area (SPA) for the Ballivor PWS. The potential for the peat extraction activities and all ancillary works to impact the hydrogeology of the Ballivor PWS has been reduced as the bog drainage regime was already largely in place at the time the source boreholes were drilled (1994). The natural hydrological and hydrogeological regime of peat bogs, with little groundwater recharge and high runoff rates, also limit the potential effects that peat extraction activities and all ancillary works that may have had on local groundwater abstractions including the Ballivor PWS. The Application Site is not located within the mapped SPA area to the Ballivor PWS. Please see Chapter 8 Hydrology and Hydrogeology for further details.

Water was not directly required for peat extraction. Water supply was used for machine washing, and for welfare and canteen facilities.

Control Measures

Pre-IPC Licence

In the period between 1988 and 2000 (i.e. before the IPC Licence took effect at the Application Site), control measures had been adopted by the Applicant to protect water supply. These measures related to machinery maintenance and storage, refuelling facilities, surface water management, a maintenance programme for internal drains, maintenance of onsite water pumps, and silt management; these measures have been outlined in Sections 4.3.5.1 to 4.3.5.9 of Chapter 4.

Post-IPC Licence

In addition to the pre-IPC Licence measures described above, since 2000 when the IPC Licence took effect, the Application Site complies with Condition 6 and Condition 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively.

Condition 6 Emissions to Water

> *6.1 No specified emission to water shall exceed the emission limit values set out in Schedule 1(i) Emissions to Water subject to Condition 3 of this licence. There shall be no other emissions to water of environmental significance.*
>
> *6.2 The licensee shall within three months of date of grant of this licence submit to the Agency or approval, a proposal for a surface water discharge monitoring location programme. This programme shall, inter alia, have regard to the current status of each bogland (virgin, under development, operational or worked out), sensitivity of the receiving water, status of silt pond upgrade programme. This programme shall be reviewed and revised as necessary each year as part of the AER.*
>
> *6.3 Monitoring and analyses of each agreed emission monitoring location shall be carried out as specified in Schedule 1(ii) Monitoring of Emissions to Water of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.*
>
> *6.4 The licensee shall, within six months of date of grant of licence, present a proposal for the installation (on a long term basis) of a composite sampler to one representative discharge point within the licensed area. The proposal shall set out the rationale for selection of the nominated discharge point as well as the sampling programme. The results of this monitoring are to be reported each year as part of the AER. Any proposal to relocate the composite sampler is to be dealt with under Condition 6.3.*
>
> *6.5 A summary report of emissions to water shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.*
>
> *6.6 The licensee shall, within six months of the date of grant of licence, develop and implement a programme to ensure that all drainage water from all boglands in the licensed area is discharged via an appropriately designed silt pond treatment arrangement. The programme, to be implemented within a period to be agreed with the Agency, shall ensure that all discharges associated with operational boglands should be prioritised within this programme.*
>
> *6.7 Within three months of the date of grant of licence, the licensee shall prepare an operational procedure for de-silting of the silt ponds. The procedure shall as a minimum provide for visual inspection of all ponds on a fortnightly basis. The de-silting roster shall be based on recommendations of such visual inspection. A log of visual inspection and de-silting shall be maintained and a summary report on thede-silting programme shall be included in the AER. The licensee shall, within twelve months of the date of grant of this licence, demonstrate to the satisfaction of the Agency that the programme of inspection is adequate.*
>
> *6.8 Silt ponds serving operational bogs shall be cleaned as a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate (refer Condition 6.7).*
>
> *6.9 Within six months of the date of grant of licence, the licensee shall prepare a programme, for agreement with the Agency, to upgrade all the sedimentation pond treatment systems. The programme shall, inter alia, address provision of additional ponds, weir or pipe installation*

(inlet and outlet), pond configuration, use of baffles, performance efficiency and frequency of de-silting. The upgrade shall have regard to the minimum silt pond specifications detailed in Condition 6.10.

6.10 Within three years of date of grant of this licence all existing silt ponds serving operational bogs shall achieve the following minimum performance criteria (flood periods excepted):

- *Maximum flow velocity < 10 cms-1*
- *Silt design capacity of lagoons, minimum 50 m3per nett ha of bog serviced*
- *All new ponds installed shall be designed to achieve these stated minimum design criteria.*

6.11 All silt ponds prone to flooding shall be de-silted by 1stNovember of each year. Excavated sludge shall be removed for disposal to a location outside the flood plain.

6.12 In respect of silt control the licensee shall, within nine months of date ofgrant of this licence, prepare and implement procedures to ensure that:

- *drainage manholes are protected and maintained free of excessive peat,*
- *headlands are kept clean and free of excessive loose peat,*
- *all new manholes and outfalls are set well back from turning grounds, drivers of bog plant do not turn short (over drains) at headlands,*
- *harrows, millers, ridgers do not drag loose peat onto manholes or into drains, outside harrow spoons are directed away from drains,*
- *silt run-off, while piping or ditching, is minimised,*
- *outfalls are controlled to minimise silt discharge during cleaning operations,*
- *drains are ditched in dry weather,*
- *while ditching, outfalls are blocked and ditch towards outfall,*
- *outlets from stockpile field drains are blocked during stockpile loading,*
- *field drains adjacent to stockpiles are cleaned as soon as practicable after stockpile loading,*
- *adequate room is allowed for rail bed beside Peco stockpiles,*
- *all fields that have been milled are ridged at the end of the production season,*
- *all fields liable to winter flooding have been cleared of milled peat or re-compacted at the end of the production season.*

Reason: To provide for the protection of the environment by way of control, limitation treatment and monitoring of emissions.

Condition 9 Water Protection

9.1 Surface & Groundwater Protection - Workshop areas and Depots

9.1.1 No potentially polluting substance or matter shall be permitted to discharge to off- site surface waters, off site storm drains or groundwaters.

9.1.2. Monitoring and analyses of surface water discharges shall be carried out as specified in Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.

9.1.3 In the event that any analyses or observations made on the quality or appearance of surface water runoff should indicate that contamination has taken place, the licensee shall carry out an immediate investigation to identify and isolate the source of the contamination,

(i) *put in place measures to prevent further contamination and to minimise the effects of any contamination on the*

environment,

(ii) *and notify the Agency as soon as is practicable.*

9.1.4. Within twelve months of the date of grant of licence, 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, either locally or remotely, to a volume not less than the greater of the following;

(i) *110% of the capacity of the largest tank or drum within the bunded area*

(ii) *25% of the total volume of substance which could be stored within the bunded area.*

9.1.5 Drainage from bunded areas shall be diverted for collection and safe disposal.

9.1.6 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. A report on such tests shall be included in the AER.

9.1.7 Within twelve months of the date of grant of licence, 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.

9.1.8 With the exception of roof water, all surface water discharges from workshop areas shall, within twenty-four months of date of grant of this licence, be fitted with oil interceptors.

9.1.9 A maintenance/cleaning log for all oil interceptors and septic tanks shall be maintained. This log shall also record the observations made during weekly inspections of all oil interceptors and bi-annual inspections of septic tanks.

9.1.10 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.9.1.5 Drainage from bunded areas shall be diverted for collection and safe disposal.

9.1.11 The provision of a catchment system to collect any leaks from flanges and valves of all over ground pipes used to transport material other than water shall be examined.

9.1.12 The licensee shall undertake a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines are tested at least every three years. A report on the first testing shall be submitted to the Agency within twelve months of the date of grant of licence and as part of the AER thereafter.

9.1.13 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

9.1.14 The licensee shall within twelve months of the date of grant of licence, arrange for the removal and safe disposal of waste oil and oil contaminated soil from the scrap storage area at Derrygreenagh Works.

9.1.15 The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.

Reason: To provide for the protection of surface waters and groundwater.

Residual Effect

The residual effect of peat extraction activities and all ancillary works on water services is considered to have had a long term imperceptible neutral effect.

Significance of Effects

Based on the assessment above there were no significant effects on water supply during the Peat Extraction Phase.

14.3.7.2.3 Wastewater

Identification of Impact

There are no underground sewerage networks within the Application Site. Welfare facilities are present at the Works area (adjacent to the Application Site boundary) from which effluent discharges into a septic tank and then to ground. Treated wastewater is released into the Deel(Raharney), Stonyford and Boyne Rivers. The nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site.

Control Measures

The Application Site complies with Condition 6 and Condition 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively.

Residual Effect

The residual effect of peat extraction activities and all ancillary works on wastewater is considered to have had a long term imperceptible neutral effect.

Significance of Effects

Based on the assessment above there were no significant effects on wastewater during the Peat Extraction Phase.

14.3.7.2.4 Waste Management

Identification of Impact

Waste generated from the peat extraction activities and all ancillary works comprised heavy and light fuels, batteries, welfare and workshop waste, machine fluids, boiler ash and plastics. Where possible, relevant materials were taken by licenced contractors and the rest was disposed of on the Application Site. Following cessation of this practice in 1998/1999, all waste awaiting deposition was collected in a skip at the Works prior to collection by a licensed waste collection contractor and transported to a suitably licenced/permitted facility for offsite reuse/recycling/recovery/disposal as appropriate. Since 2000 onwards, a waste management procedure in line with Condition 7 of the IPC Licence compliance

has been in operation at the Application Site. All waste materials are documented, weighed, recycled or reused where possible, and removed from site by licenced contractors.

Control Measures

Pre-IPC Licence

In the period between 1988 and 2000 (i.e. before the IPC Licence took effect at the Application Site), control measures had been adopted by the Applicant to mitigate any impacts associated with waste management. These measures related to have been outlined in Section 4.3.5.10 of Chapter 4.

Post-IPC Licence

In addition to the pre-IPC Licence measures described above, since 2000 when the IPC Licence took effect, the Application Site complies with Condition 6 and Condition 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively.

The measures listed above in Section 14.3.4.4 and the requirements of Condition 7 of the IPC Licence provide for the reduction, reuse and recycling of waste materials where possible. Non reusable or recyclable materials were disposed of through licenced operators. The measures undertaken in July 1988 continued until 2000 when the site fell under IPC control. Condition 7 of the licence compels the Applicant to correctly dispose of waste to licenced facilities. The Derrygreenagh Works site Co. Offaly was considered a waste disposal hub i.e. bogs within the Derrygreenagh and Allen Bog Groups transported waste to Derrygreenagh Works from where licenced contractors disposed of it accordingly.

Condition 7 Waste Management

> *7.1 Disposal or recovery of waste shall take place only as specified in Schedule 2(i) HazardousWastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/ Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.*
>
> *7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.*
>
> *7.3 A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:*
>
> > *7.3.1 The names of the agent and transporter of the waste.*
> >
> > *7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.*
> >
> > *7.3.3 The ultimate destination of the waste.*
> >
> > *7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.*
> >
> > *7.3.5 The tonnages and EWC Code for the waste materials listed in Schedule 2(i)Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.*
> >
> > *7.3.6 Details of any rejected consignments.*

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

7.4 Within nine months of the date of grant of licence, the licensee shall submit to the Agency for agreement, a proposal for identification and management of all ash and screening disposal areas. Once agreed, the proposal shall be implemented within a time-scale stipulated by the Agency.

Reason: to provide for the disposal of waste and the protection of the environment

Residual Effect

The residual effect of peat extraction activities and all ancillary works on waste management is considered to have had a long term slight negative effect.

Significance of Effects

It is considered that the Peat Extraction Phase had a long-term slight negative effect on waste management.

14.3.7.2.5 *Telecoms and Aviation*

Identification of Impact

The RTE 2rn link was established in 1970 and the remaining 11 no. links were established from 1990 onwards with continuous retention permissions and upgrades over the years, thus demonstrating the viability of the telecommunications alongside the peat extraction activities and all ancillary works. Peat extraction activities and all ancillary works had been in operation at the Application Site for decades prior to the implementation of these telecommunication links and the Applicant's activities have operated harmoniously with these communication assets for decades.

As indicated in Section 14.3.1.3 and 14.3.4.6, there are no aviation assets in the area which had or have the potential to be impacted by past or proposed activities at the Application Site.

Control Measures

No control measures for telecoms or aviation interference were undertaken.

Residual Effect

The Peat Extraction Phase has no residual effect on telecommunications and aviation.

Significance of Effects

Based on the assessment above there was no significant effects on telecommunications and aviation during the Peat Extraction Phase.

14.3.7.3 Current Phase June 2020 to Present Day

14.3.7.3.1 *Electricity*

Identification of Impact

The grid infrastructure present during the Peat Extraction Phase is the same as the Current Phase. As the onsite activity is limited to the transportation of peat from the bogs (completed by the end of 2023) and environmental monitoring, the potential for impacting any grid infrastructure is considered less than the Peat Extraction Phase.

Control Measures

The Applicant implements all the measures listed in Section 14.3.7.2.1 across all sites at all times.

Residual Effect

There is no residual effect on electricity during the Current Phase.

Significance of Effects

Based on the assessment above there is no significant effect on electricity during the Current Phase.

14.3.7.3.2 *Water Supply*

Identification of Impact

There are no underground water or sewerage networks within the Application Site. A bored well water supply and welfare facilities are present at the Works area (adjacent to the Application Site boundary) from which effluent discharges into a septic tank and then to ground. The nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site.

Control Measures

The Application Site complies with Conditions 6 and 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively

Residual Effect

The residual effect of Current Phase activities on water supply is considered to be a short term imperceptible negative effect.

Significance of Effects

Based on the assessment above there is no significant effects on water during the Current Phase.

14.3.7.3.3 *Wastewater*

Identification of Impact

There are no underground water or sewerage networks within the Application Site. A bored well water supply and welfare facilities are present at the Works area (adjacent to the Application Site boundary) from which effluent discharges into a septic tank and then to ground. The nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site.

Control Measures

The Application Site complies with Conditions 6 and 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively

Residual Effect

The residual effect of Current Phase activities on wastewater is considered to be a short term imperceptible negative effect.

Significance of Effects

Based on the assessment above there are no significant effects on wastewater during the Current Phase.

14.3.7.3.4 *Waste Management*

Identification of Impact

Since 2000, a waste management procedure in line with Condition 7 of the IPC Licence has been in operation at the Application Site. All waste materials are documented, weighed, recycled or reused where possible, and removed from site by licenced contractors. As per AERs, the volume of waste produced during the 2001 year when extraction was underway across the Derrygreenagh Bog Group was 12,892.8 tonnes (Appendix 4-3). In stark contrast, the volume of waste produced across the Derrygreenagh Bog Group in 2022 was just 760.23 tonnes (a reduction of 94% from 2001) during a non-extraction year with over 98% of this recycled or reused (Appendix 4-3). Therefore, there has been a considerable reduction in waste material produced at the Application Site since peat extraction ceased.

Control Measures

The requirements of Condition 7 of the IPC Licence provide for the reduction, reuse and recycling of waste materials where possible. Non-reusable or recyclable materials are disposed of through licenced waste operators.

Residual Effect

The residual effect of the Current Phase activities on waste management is considered to be a short term slight negative effect.

Significance of Effects

It is considered that the Current Phase has a slight effect on waste management.

14.3.7.3.5 *Telecoms and Aviation*

Identification of Impact

The potential impacts on telecoms and aviation assets remains the same as those listed for the Peat Extraction Phase in Section 14.3.2.7.4 above

Control Measures

No control measures for telecoms or aviation are identified.

Residual Effect

The Current Phase has no residual effect on telecommunications and aviation assets.

Significance of Effects

Based on the assessment above there was no significant effects on telecommunications and aviation during the Current Phase.

14.3.7.4 Remedial Phase

14.3.7.4.1 *Electricity*

Identification of Impact

The potential impacts listed in the Peat Extraction Phase and Current Phase above remain the same. As the Remedial phase involves the blocking of drains and environmental monitoring there are no impacts on electricity.

Mitigation Measures

No mitigation measures are proposed.

Residual Effect

There will be no residual effect from the Remedial Phase on electricity.

Significance of Effects

There will be no significant effect on electricity during the Remedial Phase.

14.3.7.4.2 *Water Supply*

Identification of Impact

There are no underground water or sewerage networks within the Application Site where peatland remedial works (drain blocking in year 1 and 2 only) will be undertaken. The Application Site is not located within the mapped SPA area to the Ballivor PWS.

Mitigation Measures

The Applicant will comply with IPC Licence requirements as detailed in Section 14.3.7.2.2 during the Remedial Phase, were applicable.

Residual Effect

There will be no residual effect from the Remedial Phase on water supply.

Significance of Effects

Based on the assessment above there will be no significant effects on water during the Remedial Phase.

14.3.7.4.3 Wastewater

Identification of Impact

There are no underground water or sewerage networks within the Application Site. The nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site. Control Measures

The Application Site complies with Conditions 6 and 9 of the IPC Licence which pertain to Emissions to Water and Water Protection respectively

Mitigation Measures

No mitigation measures are proposed.

Residual Effect

There will be no residual effect from the Remedial Phase on wastewater.

Significance of Effects

Based on the assessment above there will be no significant effects on wastewater during the Remedial Phase.

14.3.7.4.4 Waste Management

Identification of Impact

Since peat extraction has ceased at the Application Site, the volume of waste produced across the Derrygreenagh Bog Group has reduced by 94% since 2001 waste generation volumes, with over 98% of the remaining being reused or recycled. Waste generated from the Remedial Phase will be limited to general waste created by the limited on-site staff (3 to 4 people for the first two years then 1 to 2 people visiting per month) which will be taken off site and recycled where possible.

Mitigation Measures

The requirements of Condition 7 of the IPC Licence provide for the reduction, reuse and recycling of waste materials where possible. Non-reusable or recyclable materials are disposed of through licenced operators. The Applicant has committed to continuing the compliance with conditions outlined in the IPC Licence during the Remedial Phase, where applicable.

Residual Effect

The residual effect of the Remedial Phase activities on waste management is considered to be a long term imperceptible negative effect.

Significance of Effects

It is considered that the Remedial Phase will have no significant effect on waste management.

14.3.7.4.5 Telecoms and Aviation

Identification of Impact

The potential impacts on telecoms and aviation remains the same as those listed for the Peat Extraction Phase and Current Phase described above. The Remedial Phase activities of drain blocking, and environmental monitoring will have no impacts or interactions with telecom links and aviation assets in the area.

Mitigation Measures

No mitigation measures for telecoms or aviation are proposed.

Residual Effect

There will be no residual effect from the Remedial Phase on telecoms and aviation assets.

Significance of Effects

There will be no significant effect on telecoms and aviation assets during the Remedial Phase.

14.3.8 Cumulative and In-Combination Effects

14.3.8.1 Peat Extraction Phase

The potential cumulative and in combination effects of the Peat Extraction Phase of the Project with other relevant activities/projects at the Application Site are considered below, including that of peat extraction activities and all ancillary works at the Application Site that took place prior to 1988. Further information on activities or developments as part of the cumulative assessment are given in Chapter 2: Background.

Electricity, Telecommunications, Aviation

Peat extraction activities and all ancillary works at the Application Site had no impact or interactions on the quality or supply of electricity, telecommunications or aviation assets. Therefore, there are no cumulative or in combination effects on these assets.

Water Supply

The residual effect of peat extraction activities and all ancillary works on water services is considered to have had a long term slight negative effect. As the nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site, the cumulative or in combination effects on water supply are assessed as the same.

Wastewater

The residual effect of peat extraction activities and all ancillary works on wastewater is considered to have had a long term slight negative effect. As the nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site, the cumulative or in combination effects on water supply are assessed as the same.

Waste Management

The residual effect of peat extraction activities and all ancillary works on waste management is considered to have had a long term slight negative effect. As there were no large-scale industrial developments within the vicinity of the Application Site, the cumulative or in combination effects on waste management are assessed as the same.

14.3.8.2 Current Phase

The potential cumulative and in combination effects of the extraction industry with other relevant activities/ projects at the Application Site during this phase are considered below. Further information on activities or developments as part of the cumulative assessment are given in Chapter 2: Background.

Electricity, Telecommunications, Aviation

The Current Phase activities at the Application Site have no impacts or interactions on the quality or supply of electricity, telecommunications or aviation assets. Therefore, there are no cumulative or in combination effects on these assets.

Water Supply

The residual effect of Current Phase on water services is considered to have a short term imperceptible negative effect. As the nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site, the cumulative or in combination effects on water supply are assessed as the same.

Waste Management

The residual effect of the Current Phase activities on waste management is considered to have had a short term slight negative effect. As there are no large-scale industrial developments within the vicinity nearest the cumulative or in combination effects on water supply are assessed as the same.

14.3.8.3 Remedial Phase

Electricity, Telecommunications, Aviation

The Remedial Phase activities at the Application Site have no impacts on the quality or supply of electricity, telecommunications or aviation assets. Therefore, there are no cumulative or in combination effects on these assets.

Water Supply, Waste Management.

The Remedial Phase activities at the Application Site will have a long-term imperceptible effect on water supply and waste management. As there are nearest public water supply is located 3km away from the Application Site and the source protection area for the scheme is 2km away from the Application Site, and there are no industrial scale developments in the vicinity of the Application Site, the cumulative or in combination effects on water supply and waste management are assessed as the same.

Potential Future Land Use

There is a potential for impacts on electricity, telecommunication services, water supply and waste management associated with the implementation of the PCAS on certain parts of the Application Site,

however, there is no potential for cumulative effects on these material assets as the PCAS will be completed in place of with the rehabilitation works identified in the Remedial Phase.

It is intended to utilise the Application Site for both peatland remediation and wind energy infrastructure, to facilitate environmental stabilisation of the Application Site and the optimisation of climate action benefits. The environmental impact assessment for the proposed Ballivor Wind Farm application (Planning Ref: 316212) will include an assessment of the implementation of the rehabilitation plans in conjunction with the construction, operation and decommissioning of the wind farm. The overall footprint of the proposed wind farm will be less than 1.4% of the total area Bog Group or 1.8% of the proposed Ballivor Wind Farm Application Site, and therefore will 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 wind farm infrastructure. The EIAR for the proposed Ballivor Wind Farm development details issues related to potential impacts during wind farm construction.

The proposed Ballivor Wind Farm is assessed in a separate EIAR in terms of direct and indirect effects on the Material Assets and dedicated mitigation measures are included within its EIAR so as to avoid any negative effects on material assets within and surrounding the site. Overall cumulative effects when considering the life cycle of the site and the proposed Ballivor Wind Farm will not occur. Furthermore, cumulative effects when considering the consented Bracklyn Wind Farm (Planning Ref: 311565) and the proposed Knockanarragh Wind Farm located approx. 6km to the north) and any other proposed, permitted or operational plans or projects listed in Chapter 2 of this rEIAR will not occur.

14.4 Conclusion

Traffic and Transport

This section looks at the potential impact that traffic generated from the Peat Extraction Phase, Current Phase and Remedial Phases that the Project had, have or will have on traffic and transport.

This chapter assess the potential effects on roads and local traffic from the additional traffic movements that were generated during the peat extraction process and any traffic generated through ancillary activities pertaining to the extraction industry during the Peat Extraction Phase, including that of staff personnel commute. It also looks at the potential effect that the traffic movements associated with the Current and Remedial Phases at the Application Site may have on roads and traffic, namely remaining stockpiled peat deliveries, staff personnel commute and rehabilitation works.

The peat extracted and stockpiled peat during the Peat Extraction Phase and Current Phase was transported via trucks to various end users around the country. Based on the average annual volume of peat extracted or stockpiled per year at the Application Site and the average volume of peat transported per truck, an estimation of the annual number of Heavy Goods Vehicles (HGV) movements was determined for the Peat Extraction Phase and Current Phase. Employment figures at the Application Site for all Project Phases were also utilised to determine the traffic movements associated with staff personnel travelling to and from the Application Site. When comparing the average annual traffic movements to and from the Application Site to the average national traffic volumes counted at four identified Transport Infrastructure Ireland (TII) count locations surrounding the Application Site. As the earliest available data from the TII count locations is for 2020, for the Peat Extraction Phase, the average annual traffic volumes were factored to provide a more representative value for the baseline year of 1988. It is demonstrated that the additional volume of traffic generated by the Project would have been imperceptible to road users and road conditions, i.e., for the Peat Extraction Phase this equated to 3 - 7% of daily traffic volumes attributed to the Project, and for the Current Phase and Remedial Phase this equated to less than 1% of daily traffic volumes attributed to the Project.

By 1988, two level crossings were in place at Application Site; one at the Ballivor-Raharney road (now the R156) to facilitate train crossing from Ballivor bog to Carranstown bog and vice versa, and one to facilitate crossing from Bracklin bog to Lisclogher bog across a local road. Standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all of the Applicant crossing gates. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trans before reaching the level crossing. Extraction ceased in Lisclogher Bog in 2003 and therefore the railway crossing between this bog and Bracklin went out of use. Locomotives would have crossed the R156 an average of two times per day during the Peat Extraction Phase. Given the low frequency of crossings and the presence of gates and sensory notification lighting, the impact on road users is not considered significant.

Other Material Assets

This chapter also reviews other material assets located within the Application Site and immediate surrounds which may have been impacted by the Project such as utilities (water, wastewater, electricity, gas), telecommunications, aviation and waste management. There is no public water supply or gas infrastructure within the Application Site. The 110kV overhead line traverses Carranstown Bog and several telecommunication links pass over the Application Site. These assets were established long after peat extraction activities and all ancillary works commenced at the Application Site and have been able to operate successfully and uninhibited alongside Peat Extraction Phase and Current Phase activities and will continue to do so during the Remedial Phase of the Project. A scoping exercise with the Irish Aviation Authority indicates that no aviation assets are impacted by activities past, present or future at the Application Site

Since 2000, the Application Site has been operating under IPC Licence control which requires all hazardous and non-hazardous materials to be disposed of appropriately by licenced waste management operators. Likewise, details pertaining to waste (types, volume, name and address of licenced waste removal contractor, volumes recycled and reused), are recorded in AERs and submitted to the EPA annually and included in Appendix 4-3 of the rEIAR. Over the past few decades, peat extraction decreased at the Derrygreenagh Bog Group (of which the Ballivor Bog Group is a subset and in which the Application Site is located) and consequently the volume of waste produced has also decreased. This fall in waste production has and will continue to fall during the Current Phase and Remedial Phases due to limited activities occurring at the Application Site.

15. MAJOR ACCIDENTS AND NATURAL DISASTERS

15.1 Introduction

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared by MKO on behalf of Bord na Móna plc., as part of an application for the Substitute Consent for peat extraction and all ancillary works that have been carried out within the Application Site since 1988.

This chapter of the rEIAR considers the effects, if any, of the Project on the environment as a result of its vulnerability to, or introduction of, risks of major accidents and/or disasters. Vulnerability of major accidents and natural disasters arising from the historic peat extraction activities, including all ancillary works, at the Application Site, during the Peat Extraction Phase, the Current Phase and the Remedial Phase at the Application Site which is the subject of this Substitute Consent Application submitted to An Bord Pleanála, in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended). The potential impact of Major Accidents and Disasters on Population and Human Health is considered in Chapter 5 Population and Human Health.

The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this rEIAR, i.e., population and human health, biodiversity, land, soil (peat stability), water, air and climate and material assets, cultural heritage, and the landscape.

The full description of the Peat Extraction, Current and Remedial Phases is provided in Chapter 4 of this rEIAR.

15.1.1 Statement of Authority

This section of the rEIAR has been prepared by Gráinne Griffin and reviewed by Ellen Costello and Sean Creedon of MKO. Gráinne is an Environmental Scientist with MKO with over 3 years' experience in the environmental consultancy sector. Gráinne has experience in report writing, including Appropriate Assessments, Natura Impact Statements, feasibility studies and EIA screening reports and EIAR and rEIAR chapters including Major Accidents and Natural Disasters chapters for large-scale renewable energy developments. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Ellen is a Practitioner Member of the Institute of Environmental Management & Assessment.

Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development,

holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

Difficulties encountered in the production of this chapter include the following limitations:

- While most peat extraction processes and related activities have remained operationally consistent over the decades, some of the activities, such as the construction of infrastructure and operational decisions were initiated many decades ago, with relevant detail and documentation unavailable due to the passage of time. Therefore, reasonable and logical estimates have been based on aerial photography, planning drawings associated with relevant planning applications, and current onsite infrastructure. Aerial photographs referenced throughout can be found in Appendix 4-4. Where uncertainty exists, a precautionary approach has been adopted with regards the potential for environmental effects**;**
- Records of peat extraction volumes before 1963 and from 2000 to 2001 inclusive are not available; and,
- Records of some planning applications for infrastructure, their construction methods and mitigation measures associated with them are not available.

The information gaps are not considered to be such as to affect the robust assessment of the environmental effects of the Project.

15.2 Assessment Methodology

15.2.1 General

The following sources of information and literature pertinent to the area were used in the preparation of this section:

- Central Statistics Office (CSO): Census of Ireland 2022; Census of Ireland 2016; Census of Ireland 2011;
- Regional Planning Guidelines for the Midland Region 2010-2022;
- Regional Spatial and Economic Strategy (RSES) 2020-2032, published by the Northern and Western Regional Assembly on 23 January 2020;
- Meath County Development Plan 2021 – 2027;
- Westmeath County Development Plan 2021 – 2027;
- Historic County Development Plans for County Meath and County Westmeath dated from 1981 onwards, along with the Ballivor Development Plan for 1993 (details of which are provided for in Section 2.3.4 in Chapter 2 of this rEIAR);
- Meath County Council Website;
- Westmeath County Council Website;
- European Commission. (2017). Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports;
- Environmental Protection Agency (EPA). (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Department of Environment, Heritage and Local Government (2010) *A Guide to Risk Assessment in Major Emergency Management;*
- Environmental Protect Agency (2014) *Guidance on Assessing and Costing Environmental Liabilities;*
- Department of Defence (2020) *A National Risk Assessment for Ireland;*
- Meath County Council – Major Emergency Plan 2020;
- Westmeath County Council – Major Emergency Plan 2022;
- Health Service Authority advice for Health and Safety in the Renewable Sector. Available at: https://www.hsa.ie/eng/your_industry/renewable_energy/; and,

- National Risk Assessment: Overview of Strategic Risks. https://www.gov.ie/pdf/?file=https://assets.gov.ie/220847/1291534a-9b27-4c05-92ed-d3bd21adc89a.pdf#page=null

15.2.2 Legislative Context

15.2.2.1 Legislation

As outlined in Chapter 4, the baseline environment for this Application Site is established as July 1988, coinciding with the required transposition of the EIA Directive (Directive 85/337/EEC) into Irish Law. Prior to this required transposition date, there is no legal obligation to conduct an EIA for any activities undertaken at the Application Site. Nonetheless, we offer a concise overview of activities at the site from 1948, including the commencement of site preparation works, up until 1988 in Section 4.3 in Chapter 4. Subsequently, this chapter is retrospectively applying the latest EIA Directive (2014/52/EU) to this site.

An evaluation of the following key aspects was conducted in accordance with the EIA Directive (2014/52/EU):

- The susceptibility of the Project to potential accidents and disasters; and,
- The potential of the Project to cause significant accidents or disasters that could endanger the environment.

The details pertaining to major accidents and/or disasters to be incorporated in the rEIAR are outlined in paragraph 8 of Annex IV of the EIA Directive as follows:

> *"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".*

15.2.3 Impact Assessment Methodology

15.2.3.1 Introduction

This evaluation focuses on the assumption that the Peat Extraction, Current and Remedial Phases will adhere to the methodologies and measures outlined in this rEIAR and in particular the methodologies and measures outlined in Chapter 4 Description of Development, Chapter 7 Land, Soils and Geology, Chapter 8 Hydrology and Hydrogeology and Chapter 15 Material Assets. Hence, the overall susceptibility of these phases to major accidents and natural disasters is deemed to be low. Contemporary EIA practices already incorporate evaluations of certain potential accidents and disaster scenarios, such as pollution incidents affecting ground and watercourses, along with assessments of flooding events and peat instability. These are elaborated upon in detail in the respective chapters of the rEIAR assessment (Refer to Chapters 5 to 14 for further detail).

The Peat Extraction, Current and Remedial Phases have low potential to cause natural disasters or major accidents. The Application Site is relatively flat and so there is low risk for peat failure. Any risks associated with flooding, impacts on infrastructure, accidents etc. are addressed in the sections below.

15.2.3.2 Site-Specific Risk Assessment Methodology

There is no record of a risk assessment carried out for the Application Site in 1988. However, this chapter retrospectively implements a contemporary risk plan to the operations dating back to the 1980s. A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the Peat Extraction, Current and Remedial Phases. The approach to identifying and quantifying risks associated with the above phases by means of a site-specific risk assessment is derived from the EPA's '*Guidance on Assessing and Costing Environmental Liabilities'* document[1]. The following steps were taken as part of the site-specific risk assessment:

- Risk identification
- Risk classification, likelihood and consequence; and,
- Risk evaluation

15.2.3.2.1 *Risk Identification*

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this rEIAR (refer to *Statements of Authority* in Chapters 5 to 14 of this rEIAR). The identification of risks has focused on rare but 'plausible incidents' that could have occurred at or as a result of the Peat Extraction Phase and Current Phase (up to present day) or could occur at or as a result of the Current Phase (from present day onwards) or Remedial Phase. The review of these risks has been in accordance with European Commission guidance.

In accordance with the European Commission *Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports* (2017), risks are identified in respect of the Project's:

1. *Potential to cause accidents and/or disasters,*
2. *Vulnerability to potential disaster/accident*

15.2.3.2.2 *Risk Classification*

Classification of Likelihood

After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and applied environmental controls (with respect to activities and works undertaken during the Peat Extraction Phase and Current Phase (up to present day)) and proposed environmental controls (with respect to activities and works planned to be undertaken during the Current Phase (from present day onwards) and Remedial Phase) was considered when estimating likelihood of identified potential risks occurring. Table 15-1 defines the classification of likelihood ratings, sourced from the DoEHLG *Guide to Risk Assessment in Major Emergency Management 2010,* that have been applied.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met.

[1] *EPA (2014) Guidance on assessing and costing environmental liabilities. Available at https://www.epa.ie/publications/compliance--enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf*

Table 15-1 Classification of Likelihood (Source: DoEHLG Guide to Risk Assessment in Major Emergency Management, 2010)

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The impact rating assigned to each risk has assumed that all implemented control measures, proposed mitigation measures, and/or safety procedures have failed to prevent the major accident and/or disaster. Further, where relevant, the Meath County Council Major Emergency Plan (2011 with updates 2020) and Westmeath County Council Major Emergency Plan (2014 with updates to 2022) work to reduce the consequence of any major accident or disaster. The consequence of the impact if the event occurs has been assigned as described in Table 15-2.

Table 15-2 Classification of Impact (Source: DoEHLG, Guide to Risk Assessment in Major Emergency Management 2010)

Ranking	Likelihood	Impact	Description
1	Minor	Life, Health, Welfare	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment.
		Environment	No contamination, localised effects
		Infrastructure	<€0.5M
		Social	Minor localised disruption to community services or infrastructure (<6 hours).

2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration €3-10M Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated. Heavy contamination, localised effects or extended duration €10-25M Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M

			Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

Once classified, the likelihood and consequence ratings have been multiplied to establish a 'risk score' to support the evaluation of risks by means of a risk matrix.

The risk matrix sourced from the DoEHLG *Guide to Risk Assessment in Major Emergency Management* 2010 (and as outlined in Table 15-3) indicates the critical nature of each risk. This risk matrix has therefore been applied to evaluate each of the risks associated with the Peat Extraction, Current and Remedial Phases. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents 'high risk scenarios';
- The amber zone represents 'medium risk scenarios'; and
- The green zone represents 'low risk scenarios.'

Table 15-3 Classification of Impact (Source: DoEHLG, 2010)

		Consequence Rating				
		1. Minor	2. Limited	3. Serious	4.Very Serious	5. Catastrophic
Likelihood Rating	5. Very Likely					
	4. Likely					
	3. Unlikely					
	2. Very Unlikely					
	1. Extremely Unlikely					

15.3 Establishing The Baseline Conditions (1988)

A desk-study has been completed to establish the 1988 baseline environment against which the effects, if any, of the Project on the environment as a result of its vulnerability to, or introduction of, risks of major accidents and/or disasters assessment is being carried out. This will influence and inform both the likelihood and the impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

Before 1988, there are no recorded instances of natural disasters occurring at the Application Site. The preventive and containment measures implemented to address such incidents in 1988 are outlined, detailing their integration into the daily operations and management of the bog.

Historically, the likelihood of significant natural disasters affecting the Application Site has been low. Common potential hazards associated with the Application Site include bog fires, flooding, and landslides, with few historical occurrences.

15.3.1 Flooding

Bord na Móna have no records of flooding at the Application Site from 1988 onwards. Furthermore, there are no recurring flood incidents or instances of historical flooding identified within the Application Site on historic OS maps or in OPW flood maps. The primary flood risk on the site is pluvial flooding due to the low permeability of peat soils and subsoils. However, the extensive network of peat drains on the cutover bog surface and associated surface water outflows were largely present in 1988 and would have reduced this risk accordingly. Despite this drainage system, localized surface water ponding may have happened following intense or prolonged rainfall. Additionally, the existing topography of the bog basins allows for significant rainwater storage, mitigating any flood risk associated with pluvial flooding. Stored rainwater which accumulated as a result of rainfall events posed no additional flood risk offsite. Section 8.6.8 in Chapter 8 Hydrology and Hydrogeology assesses the potential for Major Accidents and/or Disasters and concludes that there been no risk of flooding downstream of the Application Site as a result of the historic and/or proposed activities at the Ballivor Bog Group due to the low-lying nature of the site and the attenuation provided by the on-site drainage system, in particular the presence of the settlement ponds.

15.3.2 Telecommunications, Aircraft and Collision/Loss

Radio Telefís Éireann established a TV transposer station (Planning Reference 702532) at Cairn Hill in Longford in 1970 from which a television link passes over the site to a corresponding mast in the Dublin Mountains. Peat extraction and ancillary activities, which had been established at the Application Site in 1948, prior to the installation of the RTÉ TV transposer station, did not interact with TV and telecoms links which passed over the Application Site in 1988.

15.3.3 Water Contamination

By 1988, the land use at the Application Site was well established as industrial peat extraction. Apart from Lisclogher West, all bogs were fully drained, sod and milled peat extraction were underway in certain locations and railway infrastructure was in placeInstallation of drainage had commenced at Lisclogher West by 1988 but was not complete. Pumping was ongoing at two locations in Ballivor bog and one location in Lisclogher bog. Surface water flows and discharge was managed in a controlled manner. Water contamination (primarily silt discharge) of the surrounding rivers and streams could have occurred during extreme rainfall events.

Disturbance of a large area of peat has the potential to create a peat slide and subsequently significant levels of water contamination in the surrounding streams and rivers. The Application Site is flat and heavily modified and therefore has an inherently low risk of peat slides that might result in significant water contamination. Geological Survey Ireland (GSI) does not have any records of historic landslides within the Application Site or in the surrounding lands in 1988. Section 8.6.8 Chapter 8 Hydrology and Hydrogeology states with respect to the risk of peat slides that due to the low-lying and flat nature of the Ballivor Bog Group, slope stability has posed no risk at the Application Site during any phases of the Project.

Accidental spillage of petroleum hydrocarbons during machinery and plant refuelling could have posed a pollution risk, with the potential for significant impacts on the environment due to its high toxicity and persistence. The accumulation of small spills over 1988 from routine plant use also could contribute to pollution risks. While activities associated with peat production, such as construction plant operations and wastewater discharges, could have potentially contaminated surface waters.

15.3.4 Fire

Bog fires may naturally arise during periods of dry weather. Though infrequent, they can happen during exceptionally dry conditions, causing peat, scrub, and heather to ignite spontaneously, especially if the water table has dropped and a potential source of ignition such as broken glass has been left on the bog surface. In some cases, peat stockpiles can catch fire by self-heating ignition which is a type of spontaneous initiation of fire that can take place at ambient temperatures without an external source. Furthermore, bog fires can also result from fires spreading from neighbouring landholdings into the bog areas. There is no record of bog fires at the Application Site in 1988.

15.3.5 Major Road Traffic Accident/ Severe Weather and Loss of Critical Transport Infrastructure

The transportation of peat from the Application Site would have increased traffic on public roads by movement of peat from the site to different end users nationwide. Peat-loaded trucks had the potential to release dust and soil roads, while railcars carrying peat-loaded wagons needed to cross public roads, possibly affecting traffic flow and posing accident risks. An assessment of the impact of Bord na Móna's additional traffic resulting from transporting peat loads from the Application Site to various end users around the country is discussed in Chapter 14 on Material Assets. Significant peat extraction occurred during 1988 so therefore there is potential for road traffic accidents at that time.

15.3.6 Natural Gas Explosion

There were and are no gas pipelines located within or adjacent to the Site and therefore there is no potential for a natural gas explosion at the Application Site in 1988.

15.4 Peat Extraction Phase (July 1988 – June 2020)

15.4.1 Flooding

Since 1988, all areas of the Application Site experienced decreased elevation. Despite not being subject to peat extraction, Lisclogher West likely saw some reduction in elevation due to drainage related subsidence. Applying a subsidence rate of 6mm per year to Lisclogher West, drained between 1973 and 1995, suggests its initial elevation was around 0.2 meters higher than it is currently. Furthermore, after the initial drainage of the bogs, there were minor yearly alterations in local bog hydrology and hydrogeology across the Application Site, primarily associated with peat removal and drain deepening as required. Bord na Móna estimates that from 1988 to 2020, approximately 2,920,550m^3 of peat were extracted from the site, averaging 91,267m^3 per year. The depth of peat removal varied across individual bogs due to their unique peat extraction histories. Peat acts as a water storage medium, so its removal potentially reduces the water storage capacity of the bogs. However, when peat water levels were initially reduced through drainage, the storage capacity of the top layer of peat (approximately 0.5 – 1m deep, depending on drain depth) was essentially eliminated. The primary flood risk on the site is pluvial flooding due to the low permeability of peat soils. However, the extensive network of peat drains on the cutover bog surface has diminished this risk considerably. Despite this drainage system, localized surface water ponding may have happened following intense or prolonged rainfall. The existing topography of the bog basins allows for significant rainwater storage, mitigating any flood risk associated with pluvial flooding. This stored rainwater after rainfall events posed no additional flood risk offsite. Bord na Móna have no records of flooding at the Application Site from 1988 to 2020. Furthermore, there are no recurring flood incidents or instances of historical flooding identified within the site on historic OS maps or in OPW flood maps.

15.4.2 Telecommunications, Aircraft and Collision/Loss

A telecommunication scoping exercise for the proposed Ballivor Wind Farm application found no fixed telecommunication masts within the Application Site. There are 11 no. telecommunication links traversing the Application Site, along with one Tetra Mast within 250m of the Application Site boundary. These links primarily facilitate communication between tower masts and are not directly impacted by peat extraction activities. The first of these links was established in 1970 and since then these links have been continuously maintained and upgraded, indicating their compatibility with peat extraction activities over the years. Additionally, scoping exercises with the Department of Defence and the Irish Aviation Authority revealed no potential assets in the area that might be affected by past or proposed activities at the site. Further details can be found in Chapter 14 Material Assets and in Appendix 14-1 in relation to the scoping responses provided by telecommunication operators, the Department of Defence, and the Irish Aviation Authority.

15.4.3 Water Contamination

The Peat Extraction Phase of the Project includes all works undertaken from 1988 to the cessation of peat extraction activities in June 2020. Accidental spillage of petroleum hydrocarbons during machinery and plant refuelling could have posed a pollution risk, with the potential for significant impacts on the environment due to its high toxicity and persistence. The accumulation of small spills over time from routine plant use also contributes to pollution risks. While activities associated with peat extraction, such as construction plant operations and wastewater discharges, could have potentially contaminated surface waters, available Annual Environmental Reports submitted to the EPA indicate no significant pollution events or spills to groundwater have occurred since 2000. These reports also highlight the risk posed by hydrocarbon spills to surface waters and associated ecosystems, emphasizing their high toxicity to aquatic organisms and the potential for oxygen depletion. Despite these risks, no significant pollution events have been reported for surface water since 2000.

Silt ponds and drains were established on all bogs including Lisclogher West by or during the 1988 to 2020 period. Pumping was ongoing at two locations in Ballivor bog and one location in Lisclogher bog up until 2000. Surface water flows and discharge was managed in a controlled manner. Water contamination (primarily silt discharge) of the surrounding rivers and streams could have occurred during extreme rainfall events.

Disturbance of a large area of peat has the potential to create a peat slide and subsequently significant levels of water contamination. The Application Site is flat and heavily modified and therefore has an inherently low risk of peat slide that might result in significant water contamination. Geological Survey Ireland (GSI) does not have any records of historic landslides within the Application Site or in the surrounding lands in 1988 to 2020 period. Section 8.6.8 of Chapter 8 Hydrology and Hydrogeology states with respect to the risk of peat slides that due to the low-lying and flat nature of the Ballivor Bog Group, slope stability has posed no risk at the Application Site during any phases of the Project.

15.4.4 Fire / Major Crowd Safety and Civil Disorder

A bog fire occurred at Lisclogher West and Lisclogher bogs in 2008. This fire occurred due to dry weather conditions. In both cases, the EPA was contacted, and corrective measures were put in place and the fires were brought under control. No Bord na Móna staff or third parties were involved in the outbreak of the fire and the fires were contained by Bord na Móna staff within the Application Site boundary. The 2008 dust monitoring results collected from the dust monitor located at Ballivor Bog entrance on that year were within the emission limit of 350mg/m^2/day. Since 2000, it has been a condition of the IPC Licence that fires are reported to the EPA in the Annual Environmental Reports. No additional bog fires were recorded at the Application Site during the 1988 to 2020 period.

15.4.5 Major Road Traffic Accident/ Severe Weather and Loss of Critical Transport Infrastructure

During the 1988 to 2020 period, temporary rail track was laid within the Application Site. Temporary track was lifted and laid up to 12 times a year to facilitate the transportation of peat off the bogs and into the Ballivor Works for processing. Two level crossings facilitated trains crossing the local road network. Bord na Móna's movable railway infrastructure allowed peat transportation to Ballivor Works, with tracks relocated as needed, resulting in changes to the layout over time. Utilising the rail network peat was transported to the works area for subsequent transport by road. Large volumes of peat were transported during this period with potential for road traffic accidents on the surrounding road network. An assessment of the impact of Bord na Móna's additional traffic resulting from transporting peat loads from the Application Site to various end users around the country is discussed in Chapter 14 on Material Assets

15.4.6 Natural Gas Explosion

There are no gas pipelines located within or adjacent to the Application Site and therefore there was no potential for a natural gas explosion at the Application Site during the 1988 to 2020 period.

15.5 Current Phase (June 2020 – Present Day)

15.5.1 Flooding

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction activities at the Application Site in June of 2020 to the present day. The primary flood risk on the site is pluvial flooding due to the low permeability of peat soils. However, the extensive network of peat drains on the cutover bog surface has diminished this risk considerably. Despite this drainage system, localized surface water ponding may still happen following intense or prolonged rainfall. The Local Authority Strategic Flood Risk Assessment (SFRA) mapping indicates that areas in the northwest of Lisclogher Bog are vulnerable to fluvial flooding. However, site walkovers have revealed that the EPA incorrectly map a river to cross Lisclogher Bog casting doubt on the validity of the flood zones in this area. CFRAM mapping includes modelled flood levels for the 10-year and 100-year flood events. These levels, modelled near Ballivor village, range from 64.19 – 65.34m OD and are well below the current outfall pipe elevations at the Application Site. Therefore, the risk of fluvial flooding along the Ballivor River, located to the east of the Application Site, backing up into the site drainage network is very low. Flood modelling of Ballivor, Bracklin West, and Carranstown bogs have been completed by Bord na Móna (2020). That study indicates there is sufficient storage within each of the bog basins to alleviate any flood risk associated with pluvial flooding. The risk of flooding is addressed further in Chapter 8: Hydrology and Hydrogeology and Appendix 8-1 Flood Risk Assessment.

15.5.2 Telecommunications, Aircraft and Collision/Loss

Telecommunications, Aircraft and Collision/Loss described in the Peat Extraction Phase are considered the same for the Current Phase. There have been no onsite changes or new applications for nearby links or aviation assets in the surrounding landscape that could be impacted by the Current Phase at the Application Site.

15.5.3 Water Contamination

The Current Phase of the Project encompasses the period of time between the cessation of peat extraction at the site in June of 2020 and the present day. Since the cessation of peat extraction in June of 2020, no significant effects on bog hydrogeology have been observed. By that time, all drainage

infrastructure, including field drains, main drains, and silt ponds, had been in place across the site for between 25 and 70 years, resulting in a well-established hydrogeological regime. No additional installation of drainage or deepening of drains has occurred since the cessation of peat extraction. The only activities undertaken have been minor maintenance and repairs to the drainage network and silt ponds as needed. Rehabilitation of Carranstown East, Lisclogher West and Bracklin West is ongoing as part of the Peatland Climate Action Scheme (PCAS). Geological Survey Ireland (GSI) does not have any records of historic landslides within the Application Site or in the surrounding lands from 2020 to the present day.

15.5.4 Fire

Due to historical peat extraction at the Application Site, there was an elevated risk of fire outbreak due to the volume of vehicles and regular use of locomotives across the bogs. However, peat extraction ceased in June 2020, with site activities during the Current Phase being greatly reduced when compared to the volume of activity observed during the Peat Extraction Phase. During the Current Phase, activities primarily involve onsite management, environmental monitoring, wind measurement, and the removal of existing peat stockpiles as mandated by the IPC Licence (was completed in 2023). Consequently, due to the reduced level of activity on site, the likelihood of human-induced fire outbreaks at the Application Site has reduced. There is no record of bog fires at the Application Site during the Current Phase.

15.5.5 Major Road Traffic Accident/ Severe Weather and Loss of Critical Transport Infrastructure

The assets described for the Peat Extraction Phase in Section 15.4.5 above are considered the same for the Current Phase. There have been no onsite changes or new applications for nearby links or aviation assets in the surrounding landscape that could be impacted by the Current Phase at the Application Site. Since the completion of the removal of stockpiles from the Application Site during 2023, traffic movements to and from the site have considerably reduced and therefore the risk of an offsite traffic accident has also reduced.

15.5.6 Natural Gas Explosion

There are no gas pipelines located within or adjacent to the Site and therefore there was no potential for a natural gas explosion at the Application Site.

15.6 Remedial Phase

15.6.1 Flooding

As outlined in Chapter 8, it is currently proposed to implement a Cutaway Bog Decommissioning and Rehabilitation Plan for each bog within the Application Site, with rehabilitation already completed in part of Carranstown Bog. These plans are necessary to meet the requirements of Condition 10.2 of IPC Licence No. P0501-01. Attached as Appendix 4-2, these Cutaway Bog Decommissioning and Rehabilitation Plans will be agreed with the EPA before their implementation at the relevant bog. The rehabilitation plans aim to transition the bogs within the site toward natural functioning peatlands. Currently, the drainage system was designed to facilitate peat extraction by lowering the local water table, which does not support typical bog communities. To achieve the rehabilitation goals, alterations to the existing drainage regime are necessary. Areas chosen for rewetting will undergo significant changes in bog hydrogeology. This process involves measures like drain blocking to encourage natural re-vegetation with typical bog communities. Drain blocking intensity will vary based on the existing habitats, with more intensive measures in bare peat areas. This will establish a more beneficial hydrological regime, bringing the peat water table closer to the surface. Monitoring in other

rehabilitated sites has shown relatively quick groundwater level recovery, typically within 2-5 years after rewetting. Bord na Móna have no records of flooding at the Application Site, and there is no evidence of recurring flood events based on historical maps. The Application Site is also situated beyond flood zones designated by the Office of Public Works (OPW) and the Geological Survey of Ireland (GSI). While there are concerns in flood mapping in the northwest of Lisclogher Bog, the risk of fluvial flooding from the Ballivor River is mitigated by the elevation of the outfall pipes. The primary flood risk across the Application Site is pluvial flooding due to the low permeability of peat soils, but the extensive network of peat drains reduces this risk. Recent flood modelling conducted in 2020 indicates sufficient storage capacity within each bog basin to mitigate pluvial flooding. Further details on flood risk mitigation can be found in Chapter 8 and Appendix 8-1 of the rEIAR.

15.6.2 Telecommunications, Aircraft and Collision/Loss

Telecommunications, Aircraft and Collision/Loss described in the Peat Extraction and Current Phases are considered the same at the time of writing. The Remedial Phase will comprise drainage blocking and routine environmental monitoring. No interaction with assets listed above in Section 15.4.5 are foreseen.

15.6.3 Water Contamination

There is potential for contamination and pollution of groundwater and surface water to occur from potential release of hydrocarbons, earthworks and excavations on Site. These impacts are addressed in detail in the Chapter 8 of this rEIAR. The absence of mitigation measures during the proposed Remedial Phase of the development could lead to potential effects on groundwater and surface water quality and quantity. This could cause a temporary decline in the Water Framework Directive (WFD) status of surface water bodies near the Application Site. This short-term impact is expected during the initial actions phase of the rehabilitation plans, which includes drain blocking and increased risk of hydrocarbon spills and suspended solids in watercourses. However, even without mitigation measures, the long-term effects of the rehabilitation plans are expected to positively impact the WFD status of nearby surface water bodies. This is due to the improved quality of surface water discharge from the site and enhanced water attenuation within the Application Site.

15.6.4 Fire

The IPC Licence conditions the production of Cutaway Bog Decommissioning and Rehabilitation Plans, detailing measures for permanent rehabilitation of the cutaway boglands within the licensed area, which will be achieved primarily through rewetting via drain blocking to encourage natural bog vegetation recolonization. Additionally, Bord na Móna lands are part of the Peatland Climate Action Scheme (PCAS), administered by the Department of the Environment, Climate and Communications, EPA, and the National Parks & Wildlife Service. This scheme, completed at Carranstown East and ongoing in Bracklin West, aims to restore water levels, bog skin, and carbon sink function, reducing fire risk. Both IPC and PCAS schemes have been successfully implemented at Bord na Móna windfarm sites such as Cloncreen and Mount Lucas, where renewable energy infrastructure occupies only a small portion of the site, harmoniously coexisting with peatland rehabilitation efforts, contributing to carbon offsetting and national carbon reduction goals. The restoration of water levels within the site will reduce the potential for bog fires.

15.6.5 Major Road Traffic Accident/ Severe Weather and Loss of Critical Transport Infrastructure

The potential for Major Road Traffic accidents described in the Peat Extraction Phase and the earlier stages of Current Phase are considered the same. The Remedial Phase will comprise drainage blocking, and routine environmental monitoring carried out as part of the implementation of the Cutaway Bog

Decommissioning and Rehabilitation plans. There will be a short-term increase in vehicle movements to the site during the initial stage of this phase.

15.7 General Health and Safety

As one of the country's largest and longest established industrial employers, Bord na Móna have long standing health and safety protocols in place across all their sites. Below is a list of training that was in place across all Bord na Móna landholdings including the Application Site since the 1940s and were part of the day-to-day training and operations during the year 1988 and in the years up to 2000.

- Fire safety;
- First Aid;
- Operation and maintenance of plant & machinery;
- Manual Handling;
- Use of hand & power tools;
- Site Safety;
- Road Safety;
- Safe Workshop Operation Procedures;
- Transport Operation Procedures;
- Hazard Identification, Risk Assessment; and,
- Working at Heights.

Since 2000, the site has been operating under IPC Licence. Condition 13 of the IPC Licence states that it is the responsibility of the licence holder (Bord na Móna) to ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure includes provision for minimising the effects of any emergency on the environment. As part of Bord na Móna's obligation to submit Annual Environmental Reports, Bord na Móna must include the time, location, description and frequency of incidents such as explosions, contaminations, fires, uncontrolled releases and complaints to the EPA and all incidents must be investigated.

Bord na Móna recognises the proper management of safety, health and welfare as a core business value. It acknowledges its obligations, both legal & moral, as an employer to manage and protect the safety, health and welfare of its employees and others who may be affected by its activities, and in doing so, commits to achieving and maintaining the highest standards of Health & Safety reasonably practicable. Please see Appendix 5-2 for a copy of Bord na Móna's Safety Statement which sets out arrangements to secure & manage safety, health and welfare at places of work within Bord na Móna peat operations. Through implanting the Safety Statement, Bord na Móna comply, as a minimum, with all statutory requirements, common law duties, codes of practice and best industry practice relating to peat operations activities, including the Safety Health & Welfare at Work Act 2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013.

All employees working in peat extraction activities receive training and instruction to ensure that they fully understand the hazards of their work area, the control measures put in place to minimise the risks and the emergency procedures at the facility. Training is coordinated by an in-house training specialist in conjunction with management and health & safety personnel. The services of competent persons / organisations are employed, where necessary, to carry out all other required training. Training is repeated periodically as appropriate. Training provided to all employees working in peat extraction activities included:

- Fire safety;
- First Aid;
- Operation of plant & machinery;
- Manual Handling;
- Chemical Safety;

- Machine Guarding;
- V.D.U. Safety;
- Use of hand & power tools;
- Site Safety;
- Road Safety;
- Use of Equipment;
- Safe Workshop Operation Procedures;
- Transport Operation Procedures;
- Hazard Identification, Risk Assessment;
- Work at Height;
- Legislation;
- Confined Space Entry; and,
- Office safety.

Additional training is provided in the following circumstances as necessary:

- A change in work practices;
- The introduction of new systems of work;
- A change in equipment / machinery; and,
- The introduction of new technology.

15.8 Risk Assessment

This section outlines the possible risks associated with Peat Extraction, Current, and Remedial Phases.

These risks have been assessed in accordance with the relevant classification as outlined in Table 15-1 and Table 15-2.

As outlined above, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

15.8.1 Likely Significant Effects and Mitigation Measures

15.8.1.1 'Do-Nothing' Option

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. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.2 of Chapter 4) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'Do-Nothing' scenario that drainage would have remained in situ. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'Do-Nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practise at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended) to acquire and develop peatlands; and
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and all ancillary works have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2020 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

15.8.1.2 Peat Extraction Phase 1988 to June 2020

A risk register has been developed which contains all potentially relevant risks identified during the Peat Extraction Phase. Six risks specific to the Peat Extraction Phase have been identified and are presented in Table 15-4.

Table 15-4 Risk Register – Peat Extraction Phase (1988 to June 2020)

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	**Severe Weather** Risk to peat extraction activity on site	Extreme weather- periods of heavy rainfall and strong winds
B	**Flooding** High levels of surface water on site	Extreme weather- periods of heavy rainfall and strong winds
C	**Peat Stability** Movement of peat within the site during extraction	Mismanagement of excavated material on site Severe weather conditions- storm, flooding
Potential to cause accidents and / or disasters.		
D	**Traffic Incident** Collisions onsite and offsite with vehicles involved peat extraction.	Driver negligence or failure of vehicular operations on internal machine passes and/or external road network.
E	**Contamination** Discharge or spillage of peat, fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Stockpiled peat providing a point source of exposed sediment; Erosion of sediment from emplaced site drainage channels.
F	**Industrial Accident** - Fire	Equipment or infrastructure failure; Electrical problems; Spontaneous combustion and Employee negligence.

Bog Fires

The possibility of bog fires resulting from peat extraction activities exists due to a variety of factors, including improper on-site bog management, external influences, and natural events exacerbated by dry weather conditions. These fires pose significant risks to both the environment and human health. Sources of pollution that have the potential to cause substantial environmental harm and negative health impacts include the improper storage of hydrocarbons or chemicals in bulk, as well as the storage of various types of waste materials.

Moreover, the risk of workplace accidents is heightened in industrial and large-scale settings associated with peat extraction and related activities. These accidents can occur due to a range of factors, such as negligence in safety protocols, equipment malfunctions, or human error. The consequences of such accidents extend beyond the immediate safety of workers, impacting the surrounding environment and communities.

Addressing these challenges necessitates a comprehensive approach that encompasses effective bog management practices, stringent pollution control measures, and robust workplace safety protocols. Implementing thorough risk assessment procedures, providing adequate safety training to workers, and regularly evaluating and updating safety measures are crucial steps in mitigating the risks associated with bog fires, environmental pollution, and workplace accidents. Additionally, fostering awareness and promoting responsible practices among all stakeholders are essential for creating safer and healthier environments for both people and ecosystems.

15.8.1.3 Assessment of Effect During Current Phase June 2020 to Present

Six risks specific to Current Phase (2020 to Present) have been identified and are presented in Table 15-5.

Table 15-5 Risk Register – Current Phase (2020 – Present)

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
G	**Severe Weather** Risk to decommissioning activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
H	**Flooding of site** High levels of surface water on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
I	**Traffic Incident** Collisions onsite and offsite with vehicles involved in construction of Proposed Development	Driver negligence or failure of vehicular operations on internal machine passes and/or external road network.

J	**Contamination** Discharge or spillage of peat, fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Stockpiled peat providing a point source of exposed sediment; Erosion of sediment from emplaced site drainage channels.
K	**Industrial Accident - Fire**	• Equipment or infrastructure failure; • Electrical problems; • Spontaneous combustion and • Employee negligence.

Bog Fires

As discussed in Section 15.3.4 there is potential for occurrences of fires on industrial peatlands where water tables have been lowered due to the presence of drainage to facilitate peat extraction, either through human interference such as improper machinery use or accidents involving fuels and locomotives, or through the autoignition of scrub leading to fires spreading onto bogs from nearby lands. An example of such a bog fire incident took place at Lisclogher West and Lisclogher bogs in 2008, attributed to dry weather conditions. In response, the EPA was promptly informed, and corrective actions were swiftly taken to bring the fires under control. It's notable that neither personnel from Bord na Móna nor any third parties were implicated in causing these fires, which were effectively contained within the site boundaries by Bord na Móna staff.

Monitoring data from 2008, gathered at the Ballivor Bog entrance, indicated that dust emissions were kept within the permissible limit of 350mg/m^2/day. Subsequent to that, there have been no further recorded incidents of fires within the Application Site. Since 2000, it has been mandatory under IPC Licences to report any fires to the EPA in the Annual Environmental Reports.

During the Current Phase from June 2020 onwards, peatland decommissioning and rehabilitation measures as required by the IPC Licence were implemented across all bogs. Additionally, PCAS rehabilitation measures are ongoing at Carranstown East Bracklin West and Lisclogher West in 2024, focusing on rewetting bogs through drainage blocking to facilitate the recolonization of bog vegetation, with efforts continuing throughout the Current Phase to restore natural conditions and reduce the potential for fire outbreaks.

Since June 2020, there has been no peat extraction at the Application Site, resulting in no significant changes in landscape or drainage patterns, thus minimizing the risk of peat failure. Furthermore, a notable decrease in activities such as hot works, refuelling, and potential staff negligence has occurred following the cessation of peat extraction, further reducing the likelihood of internal source fires. While the potential for bog fires due to dry weather conditions remains, such incidents are exceptionally rare.

Five risks specific to the Remedial Phase have been identified and are presented in Table 15-6.

Table 15-6 Risk Register – Remedial Measures Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
L	**Severe Weather** Risk to rehabilitation activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
M	**Flooding of site** High levels of surface water on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
N	**Traffic Incident** Collisions onsite and offsite with vehicles involved in rehabilitation plans	Driver negligence or failure of vehicular operations on internal machine passes and/or external road network.
O	**Contamination** Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Stockpiled peat providing a point source of exposed sediment. Erosion of sediment from emplaced site drainage channels.
P	**Industrial Accident - Fire**	• Equipment or infrastructure failure; • Electrical problems; • Spontaneous combustion and • Employee negligence.

During the Remedial Phase, there will be limited works at the Application Site. There will be minimal machinery present to carry out drainage blocking, and no hotworks or railcar movements are planned.

The full benefit of the Bord na Mona Cutaway Bog Decommissioning and Rehabilitation Plans and associated measures is not expected until pioneer habitats have developed on the majority of bare peat after 10 years. Consequently, the potential for bog fires during the Remedial Phase will continue to decrease over that period. These measures reflect a proactive approach to mitigate risks and ensure the safety and environmental well-being of the site during this phase. By reducing activity on site and implementing rehabilitation measures, the overall risk profile of the site is expected to improve, benefiting both the local environment and the safety of personnel working in the area.

15.8.2 Risk Assessment Summary

The risks have been assessed in accordance with the relevant classification (Refer to Table 15-1 and Table 15-2) and the resulting risk analysis is given in Table 15-6.

The risk register is based upon possible risks associated the Peat Extraction Phase, Current Phase, and Remedial Phase. As outlined in Section 15.2.3.2, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

15.8.2.1 Assessment of Effect – Summary

Table 15-7 Risk Assessment

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Peat Extraction Phase (1988 to 2020)								
A	**Severe Weather**	Extreme weather- periods of heavy rainfall, and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Section 10.3.2 Chapter 10 - Climate relating to the Met Éireann meteorological data recorded for the 30-year period from 1979-2008 in the area.	1	The risk of severe weather conditions during the Peat Extraction Phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.	2
B	**Flooding**	Extreme weather- periods of heavy rainfall, and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in Chapter 8 Hydrology and Hydrogeology and due to no recurring or historic flood incidents	1	The risk of flooding during the Peat Extraction Phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					being recorded within the area		and a small number of minor injuries with first aid treatment'.	
C	**Peat Stability**	Mismanagement of excavated material on site Extreme weather conditions	Movement of peat within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	1	Generally, the only recorded landslides which relate to peat instability on raised bogs have occurred during the initial stages of bog drainage. The GSI or Bord na Móna records do not document the occurrence of any peat slides within the Application Site. All bogs have active and extensive drainage systems.	2	Peat instability during the Peat Extraction Phase will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4
D	**Traffic Incident**	Driver negligence or failure of vehicular operations on site roads. Traffic Management	Injury or loss of life.	3	Due to the level of traffic movement within the site and off site due to the transportation and extraction of peat it can be determined that there is some 'opportunity, reason or means for a vehicle collision to occur	1	A minor consequence is predicted. Having regard to on-site speed limits and off-site vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		not implemented or not adhered			on or off site, 'at some time.' An unlikely risk is therefore predicted.		fatalities and small number of minor injuries with first aid treatment.'	
E	**Contamination**	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Stockpiled excavated material providing a point source of exposed sediment; Erosion of sediment from emplaced site drainage channels	Damage to, or depletion of aquatic habitats and species. Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies	2	There is potential for impacts on groundwater and surface water through accidental leaks and spills of hydrocarbons during the refuelling process, during this phase. Similarly, discharges from the Works and welfare facilities have the potential to cause surface water and groundwater contamination.	2	The risk of a fuel spillage or impact on surrounding drainage during peat extraction will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas and proposed drainage mitigation measures during construction. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
F	**Industrial Accident - Fire**	Spontaneous Spread from neighbouring lands	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	3	Spontaneous bog fires/bog fire spread is rare (2 small, contained fire occurrences in 23 years).	2	Bog fires caused by autoignition or due to spread from neighbouring lands tend to be small in nature and can be contained much more easily than fires caused by explosion. Simple contamination of environment (e.g. watercourses), localised effects of temporary duration.	2
Current Phase (2020 – Present)								
G	**Severe Weather**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Section 10.3.2 Chapter 10 - Climate relating to the Met Éireann meteorological data recorded for the 30-year	1	The risk of severe weather conditions during the Current Phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather event occur, with 'no fatalities and a	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					period from 1979-2008 in the area.		small number of minor injuries with first aid treatment'. Decommissioning and Rehabilitation will not require significant excavations works. There is no real likelihood of any impact on any environmental receptors	
H	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Groundwater Flooding; Flooding to surrounding properties Damage to, or depletion of aquatic habitats and species.	2	The risk of flooding is considered very unlikely when taking into account the assessment in Chapter 8 Hydrology and Hydrogeology of the rEIAR.	1	Flooding during the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather event occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
I	**Traffic Incident**	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented	Injury or loss of life.	2	A limited number of vehicles will be permitted on the site as part of the Current Phase. As such, it can be determined that there is some 'opportunity, reason or means for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and off-site vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3
J	**Contamination**	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles.	Damage to, or depletion of aquatic habitats and species. Discharge to groundwater. Accidental spillage during refuelling onto subsoils	2	Despite the cessation of peat extraction at the Application Site, there was still some 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 Ballivor Works (which is outside the	1	With the cessation of peat extraction, there was less potential for disturbance of peat and elevated concentrations of suspended sediments entering surface watercourses. Similarly, the activity of machinery and plant has been reduced, therefore lowering the potential occurrence of accidental	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					Application Site) remain in place and discharges from wastewater systems (septic tanks) etc. have the potential to cause surface water and groundwater contamination		spillages of hydrocarbons. This will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. There is no real likelihood of any impact on any environmental receptors	
K	**Industrial Accident - Fire**	Spontaneous Spread from neighbouring lands	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	The potential for bog fires due to dry weather conditions remains but this occurrence is very rare. However, the cessation of peat extraction has resulted in a significant reduction in hotworks, vehicle use and other potential sources of ignition within the Application	2	Should a fire occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					site. All peat stockpiles have been removed from the site reducing the potential for auto ignition events. The site has started to naturally revegetate reducing the area of bare peat. Rehabilitation has commenced in certain parts of the sites leading to an elevation in the water table and rewetting.		result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	
Remedial Phase								
L	**Severe Weather**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Chapter 10 - Climate and weather conditions recorded in the wider area.	1	The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects. There is no real likelihood of any impact on any environmental receptors	
M	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in Chapter 8 Hydrology and Hydrogeology and due to no recurring or historic flood incidents are recorded within the area.	1	The risk of flooding during the Remedial Phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects. There is no real likelihood of any impact	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							on any environmental receptors	
N	**Traffic Incident**	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented	Injury or loss of life.	2	A limited number of vehicles will be permitted on the site during the initial stages of the Remedial Phase. A very low level of vehicles will access the site during the monitoring stage of the Remedial Phase. As such, it can be determined that a traffic accident is not expected to occur and therefore a very unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and off-site vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	2
O	**Contamination**	Failure of fuel storage tank or tanks in plant and machinery and vehicles.	Damage to, or depletion of aquatic habitats and species Release of fuel spillages to surface watercourses and groundwaters	2	The Cutaway Bog Decommissioning and Rehabilitation plans stipulate drain blocking. This will require the use of plant and machinery and will be completed over a short period of	1	The risk of a fuel spillage or impact on surrounding drainage during the Remedial stage will result in a minor consequence in that 'small number of people would be	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					time by a limited number of machines on site at any one time. Fuel will not be stored at the site during this phase.		affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects. There is no real likelihood of any impact on any environmental receptors.	
P	**Industrial Accident - fire**	Spontaneous Spread from neighbouring lands	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	1	Peatland rehabilitation measures in the form of revegetation and bog rewetting reduce the potential for bog fires considerably.	1	Bog fires caused by autoignition or due to spread from neighbouring lands tend to be small in nature and can be contained much more easily than other types of fires such as those caused by explosion. No contamination of environment (e.g. watercourses), localised	1

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							effects. There is no real likelihood of any impact on any environmental receptors	

The risk assessment for each of the potential risks identified are consolidated in Table 15-8 which provides their 'risk score.' A corresponding risk matrix is provided in Table 15-9, which is colour coded to provide an indication of the critical nature of each risk. As outlined in Section 15.2.3.2, the red zone represents 'high risk' scenarios', the amber zone represents 'medium risk' scenarios, and the green zone represents 'low risk' scenarios.

Table 15-8 Risk Scores

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Peat Extraction Phase (1988-2020)				
A	Severe Weather	2	1	2
B	Flooding	2	1	2
C	Peat Stability	1	2	2
D	Traffic Incident	3	1	3
E	Contamination	2	2	4
F	Industrial Accident - Fire	3	2	6
Current Phase (June 2020-Present)				
G	Severe Weather	2	1	2
H	Flooding	2	1	2
I	Traffic Incident	2	1	2
J	Contamination	2	1	2
K	Industrial Accident - Fire	2	2	4
Remedial Measures Phase				
L	Severe Weather	2	1	2
M	Flooding	2	1	2
N	Traffic Incident	2	1	2
O	Contamination	2	1	2
P	Industrial Accident - Fire	1	1	1

Table 15-9 Risk Matrix

		Consequence Rating				
		1. Minor	2. Limited	3. Serious	4.Very Serious	5. Catastrophic
Likelihood Rating	5. Very Likely					
	4. Likely					
	3. Unlikely	D	F			
	2. Very Unlikely	A,B,G,H,I,J,L,M,N,O	E,K			
	1. Extremely Unlikely	P	C			

Table 15-9, presents the potential risks identified during the Peat Extraction Phase, Current Phase, and Remedial Phase, all of which can be classified as 'low risk scenarios.'

The scenarios with the highest risk score in terms of a major accident and/or natural disaster during the Peat Extraction Phase, Current Phase, and Remedial Phase, are identified and detailed below:

Peat Extraction Phase – Industrial Accident - Fire

Between 1988 and 2020, the peat extraction activities at the site did not cause significant changes to land cover or additional land take, following initial operations such as drainage and vegetation removal which occurred primarily before 1988. Minor topographic changes were observed due to peat removal. Peat fires were recorded in 2008 on Lisclogher West and Lisclogher bogs. During the 1988 to 2020 period there was potential for further bog fires at the Application Site due to the relatively high level of activity arising from extraction of peat by machinery, movement of peat within the site by train/plant, the presence of peat stockpiles, maintenance of the drainage network and the movement of employees within the site. The potential for Traffic Accidents was also relatively high due to the transportation of peat by truck from the site and the number of employees travelling to and from the site at the beginning and end of the working day.

Current Phase – Industrial Accident – Fire

Peat extraction ceased at the Application Site in 2020 and both the level of activity on-site and the number of employees accessing the site began to reduce from that point to the current day. Peat stockpiles continued to be present on the site up until 2023 and therefore activities such as peat movement, the presence of peat stockpiles, drainage network maintenance and employee movement were evident. Areas within the site commenced to naturally revegetate over this period and specific areas of the site such as Carranstown bog were subject to Cutaway Bog Decommissioning and Rehabilitation. Both activities combined would have lowered the probability of a peat bog fire. Although less probable there remained a risk that a Peat Bog fire could occur. No peat bog fires were recorded during the 2020 to present day period. Traffic levels from the site would have reduced significantly once the peat stockpiles had been fully removed during 2023 and therefore Traffic incidents became less probable.

Remedial Phase – Severe Weather/Flooding/Traffic Incident/Contamination

During this phase and specifically after the drain blocking works have been completed, the potential for a Major Accident or Disaster to occur at the site is very low. Activity levels at the site will be reduced to occasional site visits as part of monitoring the outcome of the rehabilitation plans and compliance with the IPC Licence requirements.

15.8.3 Mitigation Measures

As discussed in this chapter, the key type of potential natural disasters that could happen at the Application Site are bog fires, flooding and contamination. The key risk to the site during both the Peat Extraction and Current Phases is peat bog fires. Mitigation measures implemented at the site during the Peat Extraction and Current Phases and proposed to be implemented during the Remedial Phase are outlined below.

15.8.3.1 Peat Bog Fires

The key control/mitigation measures for this potential risk are outlined in detail in Appendix 5-1 Fire Prevention & Fire Fighting Procedures for Peat Production Bogs, summarised below and included in Section 5.5.5.1 of Chapter 5 Population and Human Health.

Bord na Móna's focus when it comes to the prevention and management of bog fires is:

- Protection and safety of employees and members of the public;
- Protection of external property;
- Protection of Bord na Móna property; and,
- Protection of habitats and biodiversity.

At present, fire safety and awareness training is provided as part of Bord na Móna's general safety induction with reoccurring refresher training every three years.

To ensure no instances of internal fire sources, all Bord na Móna staff:

- Receive fire training and refresher training provided periodically. Bord na Móna Fire Safety Training includes the following:
  - General Fire safety awareness and fire detection / prevention;
  - Use of fire extinguishers;
  - Use of machinery in firefighting;
  - Use of pumps, floatation pumps and fire rollers;
  - Fire prevention for machinery, including washing and blowing down;
  - Use and maintenance of PPE used in firefighting;
  - Dealing with small fires; and,
  - General Health and Safety, including Hazard Identification and Risk Assessment.

Bord na Móna Resource Managers designate control persons for firefighting. Their responsibilities include:

- Management of persons (including members of the public) entering and leaving sites under control;
- Co-ordination of persons on sites under their control;
- Liaison with Fire and other emergency services as necessary;
- Organisation of welfare facilities;
- Establish and maintain frequent contact with relevant external organisations and local fire services; and,
- Each Bog Area operation leader / team leader / supervisor must ensure the following:
  - Firefighting machinery is available and ready for use if required;
  - Minimum of one fire roller unit (Tractor with attached roller) is available and ready for use in each area;

- Lights are working on all machines;
- Flashing beacons are ready and are placed on all relevant machines during firefighting activities;
- All machines have appropriate numbers of fire extinguishers;
- Fire extinguishers checked daily, and a reserve number are kept;
- All tractors have fire buckets and shovels, and all dozers have afire bucket;
- Water sources on or adjacent to bog are appropriate, maintained, and available for use during firefighting;
- Fire signs are in place and maintained;
- Maps and aerial photographs provided to areas are in place and maintained; and,
- Emergency contact numbers for each area in place.

15.8.3.2 Contamination

Control/Mitigation measures that are and have been applied to minimise contamination of peat, subsoil and bedrock are outlined in Section 7.5.2.3 of Chapter 7 Land, Soils and Geology. This section outlines the control measures that were in place from 1988 to 2000 and range from machinery inspections/servicing, spill control measures, waste oil management and disposal of waste oils. This section also describes in detail the control measures that are in place from 2000 to the current day that arise from the implementation of the IPC Licence. These control measures include, replacement of all underground tanks, storage of all tanks/drums in bunded areas, bund testing, use of oil interceptors and regular inspections and monitoring.

15.8.3.3 Flooding

Section 8.6.8 of Chapter 8 Hydrology and Hydrogeology chapter addresses the potential for flooding to result in downstream Major Accidents and Disasters and concludes that there has been no risk of flooding downstream of the Application site during the Peat Extraction and Current Phases and also no potential risk during the Remedial Phase due to the low lying nature of the site and the attenuation provided by the on-site drainage system, in particular the presence of the settlement ponds. Therefore, aside from the control measures proposed as part of the Cutaway Bog Decommissioning and Rehabilitation Plans no additional control/mitigation measures are proposed.

15.9 Residual Effects

15.9.1 Peat Extraction Phase (July 1988 – June 2020)

The risk assessment in Section 15.8 clearly identifies Industrial Accident – Fire as the key risk that could result in a Major Accident or Disaster. As previously stated, a bog fire did occur in 2008 on the Lisclogher and the Lisclogher West bogs. No other bog fires were recorded during the 1988 to 2020 period. A range of control measures were in place during this period and the application of these measures ensured that the residual impact was negative, not significant, short term and unlikely. Other potential risks identified during this phase have an imperceptible residual impact.

15.9.2 Current Phase (June 2020 – Present Day)

The risk assessment in Section 15.8 clearly identifies Industrial Accident – Fire as the key risk that could result in a Major Accident or Disaster during this phase. No peat bog fires were recorded during this phase. A range of control measures were in place during this period and the application of these measures ensured that the residual impact was neutral, imperceptible and unlikely.

15.9.3 Remedial Phase

The risk assessment in Section 15.8 clearly identifies Severe Weather, Flooding, Traffic Incident and Contamination as the key risks that could result in a Major Accident or Disaster during this phase. The probability for each of these risks is very low. There are a range of control/mitigation measures that are in place or proposed as part of existing Bord na Móna site management, the IPC Licence requirements and within the Cutaway Bog Decommissioning and Rehabilitation plans. It is stated in Section 8.6.8 of Chapter 8 Hydrology and Hydrogeology that there is no risk of downstream flooding and that there is no risk of peat slides that might lead to contamination. Therefore, these elements have a neutral, imperceptible unlikely residual effect. The application of the current and proposed control/mitigation measures will ensure that the residual impact for the remaining risks (Severe Weather, Contamination (spillages) and Traffic Incidents) is negative, imperceptible, unlikely and temporary.

15.10 Assessment of Cumulative Effects and In Combination Impacts

15.10.1 Peat Extraction Phase (1988 to 2020)

When considering the Peat Extraction Phase 1988 - June 2020 with peat extraction activities and all ancillary works on the Application Site from 1948-1988, cumulative effects are not possible as there is no temporal overlap between the phases. No Major Accidents or Disasters occurred during the 1988 to 2020 period aside from peat bog fires on Lisclogher and Lisclogher West bogs in 2008. The impact of those fires was not considered to be significant. In any case there are no records of major accidents or disasters that occurred during the 1948 to 1988 period and therefore there is no cumulative effect with peat extraction prior to 1988. Similarly, there are no recorded Major Accidents or Disasters in proximity to the Application Site during the 1988 to 2020 period and no potential for cumulative or in combination impact.

15.10.2 Current Phase (2020 to Present)

During this phase there were no Major Accidents or Disasters and therefore there is no potential for cumulative or in combination impacts with other projects or plans.

15.10.3 Remedial Phase

Bord na Móna intend to utilize the Application Site for two main purposes: peatland rehabilitation and the installation of wind energy infrastructure. This dual strategy aims to achieve environmental stabilization of the bog group while maximizing the benefits for climate action. The proposed Ballivor Wind Farm is designed to consist of 26 no. turbines, with development infrastructure planned across several bogs within the Ballivor Bog Group.

Despite its significant potential, the overall footprint of the wind farm will be less than 3% of the total area of the Ballivor Bog Group. To address environmental concerns, decommissioning and rehabilitation plans for each affected incorporates this infrastructure. These plans incorporate the wind farm infrastructure while focusing on key objectives such as rewetting and revegetation, especially around and between the proposed wind farm infrastructure.

Regarding risk management, the main concerns revolve around peat stability and flooding. Fortunately, due to the flat and low-lying nature of the Ballivor Bog Group, slope stability has not been an issue during any development phases. Additionally, there has been no significant risk of flooding downstream from the site, thanks to both historical conditions and the proposed on-site drainage system, including settlement ponds which help attenuate water flow.

There is low potential for natural disasters to occur at the proposed Ballivor Wind Farm site. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited and these have been assessed in the context of the whole project, cumulatively in this chapter and in the wider rEIAR.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The proposed Ballivor Wind Farm site is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO sites and so there are no potential effects from this source. There is no real likelihood of significant environmental effects cumulatively associated with major accidents.

Similarly, when factoring in the consented Bracklyn Wind Farm, the proposed Knockanarragh Wind Farm, and any other listed plans or projects, cumulative effects are not expected to occur.

15.11 Conclusion

The 1988 baseline and subsequent Peat Extraction, Current and Remedial Phases of the activity have been described in detail in Sections 15.3, 15.4, 15.5 and 15.6. Utilising the impact assessment methodology described in Section 15.2.3 the key Major Accident and/or Disaster scenarios were identified for each phase and a risk assessment for each scenario was conducted. All scenarios identified and assessed in Section 15.8 for each of the three phases were determined to be low risk scenarios. The risk assessment assumes that all proposed mitigation measures and safety procedures have failed. The potential for Major Accidents or Disasters has reduced since peat extraction ceased in 2020 and reduced further when the last volumes of peat were transported offsite in 2023. The potential for a Major Accident or Disaster during the Remedial Phase is very low and the residual impact is determined to be imperceptible during this phase. Finaly there was no potential for significant cumulative or in combination impact with other plans or projects identified during each of the three phases.

16. INTERACTION OF EFFECTS

16.1 Introduction

The preceding Chapters 5 to 15 of this rEIAR identify the potential significant environmental effects that may have occurred and which are likely to occur into the future in terms of Population and Human Health, Biodiversity, Land, Soils and Geology, Hydrology and Hydrogeology, Air Quality, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage), Material Assets, and Vulnerability to/from Major Accidents and Natural Disasters as a result of the Project as described in Chapter 4 of this rEIAR. All of the potential significant effects of the Project have been outlined in the preceding chapters of this rEIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect.

A matrix is presented in Table 16-1 below to identify potential interactions between the various aspects of the environment already assessed in this rEIAR. The matrix highlights the occurrence of potential positive or negative effects during the Peat Extraction Phase, Current Phase, and Remedial Phase. The matrix is symmetric, with each environmental component addressed in the chapters of this rEIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

The potential for interaction of effects has been assessed as part of the Impact Assessment process. While the work on all parts of the rEIAR were not carried out by MKO, the entire project and all the work of all sub-consultants was managed and coordinated by the company. This rEIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and effects that potentially interact have been assessed in detail in the individual chapters of the rEIAR above and summarised in Section 16.2 below. Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided by design or reduced by the identified control measures and proposed mitigation, as presented throughout the rEIAR.

Table Key

No Interacting Effect:		**Positive Effect*:**	
Neutral Effect:		**Negative Effect*:**	

*Please note that, in the interest of clarity, any potential positive or negative interacting effect is identified in the matrix below, irrespective of significance of effects. For example, a negative interacting effect is identified when the effect is identified as significant as well as when an effect is identified as imperceptible. Section 16.2 below provides further clarity on the significance of interacting effects.

Table 16-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population & Human Health	Biodiversity including Ornithology	Land, Soils & Geology	Water	Air Quality	Noise & Vibration	Landscape & Visual	Cultural Heritage	Material Assets	Climate	Major Accidents & Natural Disasters
Population & Human Health	PEP											
	CP											
	RP											
Biodiversity	PEP											
	CP											
	RP											
Land, Soils & Geology	PEP											
	CP											
	RP											
Water	PEP											
	CP											
	RP											
Air Quality	PEP											
	CP											
	RP											
	PEP											

	Phase	Population & Human Health	Biodiversity including Ornithology	Land, Soils & Geology	Water	Air Quality	Noise & Vibration	Landscape & Visual	Cultural Heritage	Material Assets	Climate	Major Accidents & Natural Disasters
Noise & Vibration	CP											
	RP											
Landscape & Visual	PEP											
	CP											
	RP											
Cultural Heritage	PEP											
	CP											
	RP											
Material Assets	PEP											
	CP											
	RP											
Climate	PEP											
	CP											
	RP											
Major Accidents	PEP											
	CP											

	Phase	Population & Human Health	Biodiversity including Ornithology	Land, Soils & Geology	Water	Air Quality	Noise & Vibration	Landscape & Visual	Cultural Heritage	Material Assets	Climate	Major Accidents & Natural Disasters
& Natural Disasters	RP											

16.1.1 Statement of Authority

This section of the rEIAR has been prepared by Ellen Costello and Natalia Stolarska, and reviewed by Sean Creedon, of MKO. Ellen Costello is a Senior Environmental Scientist with MKO with over four years of experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Natalia Stolarska is a Graduate Environmental Scientist with MKO. Natalia holds a BSc in Earth and Ocean Science and an MSc in Environmental Leadership. Natalia's key strengths and areas of expertise are in drafting EIAR report chapters, environmental impact assessment screening reports, wind farm feasibility studies and QGIS mapping. Since joining MKO in September 2023, Natalia has been involved as a Graduate Environmental Scientist in a range of wind farm projects, assisting with field work, client briefing notes, constraints mapping and drafting EIAR chapters, with more projects in the pipeline.

Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

16.2 Impact Interactions

16.2.1 Population and Human Health

Population and Human Health and Noise and Vibration

Peat Extraction Phase (July 1988 – June 2020)

The peat extraction activities and all ancillary works increased noise levels in the vicinity of the Application Site as a result of heavy machinery on site extracting peat, transporting it for processing and then removing it off site in trucks to various end users around the country. As such, a long-term, slight, negative, but not significant residual effect on population and human health due to increased noise levels has occurred. However, there are no records of noise complaints for the Peat Extraction Phase due to the implementation of noise limits set by the IPC Licence in 2000 (See Appendix 4-1 for details). Likewise, there have been no noise complaints or breaches of noise limits prior to 2000.

Current Phase (June 2020- Present Day)

A significant reduction in plant machinery and onsite staff vehicles across the site during the Current Phase means that there are less sources of noise. Peat extraction ceased at the Application Site in June 2020. Therefore, a short-term, imperceptible, negative and not significant residual effect on population and human health has occurred during the Current Phase.

Remedial Phase

The Remedial Phase will involve the use of an excavator to facilitate drainage blocking works at any one location for less than a day as part of the Cutaway Bog Decommissioning and Rehabilitation Plans. As such, a long term, imperceptible, negative and not significant residual effect on population and human health due to noise will occur. Please see Chapter 11: Noise and Vibration and Appendix 4-2 Cutaway Bog Decommissioning and Rehabilitation Plans for further details.

Population and Human Health and Air Quality and Climate

Peat Extraction Phase (July 1988 – June 2020)

Peat extraction activities and all ancillary works would have generated dust impacts at nearby properties within the vicinity of the Application Site, as identified in Chapter 9: Air Quality. Peat would have generated some dust emissions, particularly with the milling, harrowing, ridging and harvesting processes associated with milled peat extraction. Given the extensive control measures carried out at the Application Site prior to the IPC Licence combined with the dust monitoring and condition compliance since 2000, it is considered that emissions from the peat extraction activities and all ancillary works had a localised long-term, negative, imperceptible residual impact on population and human health due to air quality. Please see Chapter 9 Air Quality for further details.

A total of 2,703,053 tonnes of CO_2 was directly or indirectly removed over the July 1988 – June 2020 period through peat extraction. The removal of the carbon sink potential of the site and the subsequent release of CO_2 from the peat extraction activities and all ancillary works activities resulted in a long-term, negative significant residual effect population and human health due to climate. Please see Chapter 10 Climate for further details.

Current Phase (June 2020- Present Day)

Peat extraction ceased in June 2020 and since then, emissions are generated by staff vehicles and small and infrequent truck deliveries from the Application Site to end users around the country. As such, a short-term, imperceptible, negative residual effect on population and human health due to air quality and climate has occurred.

Remedial Phase

The Remedial Phase will involve the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans for each bog which aims to encourage the natural revegetation of the bogs and their eventual return to a carbon sink. As such, there will be a long term, imperceptible, neutral residual effect on population and human health due to air quality and climate. Please see Chapter 9 Air Quality and Chapter 10 Climate for further details.

Population and Human Health and Land, Soils and Geology

Peat Extraction Phase (July 1988 – June 2020)

Peat extraction activities by their very nature had a long term, significant, negative impact on peat and subsoils. The activities involved the permanent removal of peat from the Application Site resulting in a loss of peat depth at the Application Site. Accidental spillage during refuelling of machinery and plant (static and mobile) with petroleum hydrocarbons was a pollution risk during the Peat Extraction Phase. Furthermore, discharges from wastewater systems (septic tanks) at office buildings, and at welfare facilities, and workshops could potentially have caused surface water and groundwater contamination.

The potential for contamination of soils is considered to have had a short-term, imperceptible negative effect on population and human health during the Peat Extraction Phase.

Current Phase (June 2020- Present Day)

The Current Phase involves the removal of stockpiles from the site and environmental monitoring; no intrusive works are being carried out and therefore the potential for soil contamination and peat instability are considered unlikely. As such, a short-term, imperceptible and negative effect on population and human health due to land, soils and geology is associated with the Current Phase.

Remedial Phase

The Remedial Phase will involve minimal use of machinery to facilitate drain blocking. Impacts on Human Health through soil contamination during this phase is considered to be negative, imperceptible, short-term and unlikely. Once drain blocking is complete, these potential impacts are removed. Please see Chapter 7 Land, Soil and Geology for further details.

Population and Human Health and Water

Peat Extraction Phase (July 1988 – June 2020)

Groundwater tables were first lowered at the Application Site in the late 1940s by the construction of drains, drying the bogs out and rendering them unsuitable for bog vegetation. The bog drainage was already implemented prior the establishment of the nearest Public Water Scheme located 3km from the Application Site. Ongoing peat extraction activities and all ancillary works during the Peat Extraction Phase had a long term, imperceptible, negative residual effect on water quality. However, due to the nature of the peat extraction process, combined with the control measures and environmental monitoring implemented at the site, no water related impacts on human health have likely resulted from the Peat Extraction Phase. Please see Chapter 8 Hydrology and Hydrogeology for further details.

Current Phase (June 2020- Present Day)

Peat extraction has ceased since June 2020. The cessation of peat extraction at the onset of the Current Phase, and the continuation of all other activities (as described in Section 4.8 of Chapter 4 Description of Development) during the Current Phase have resulted in a short-term, imperceptible, negative residual effect on water quality. However, due to the cessation of peat extraction, combined with the control measures and environmental monitoring implemented at the site, no water related impacts on human health have likely resulted from the Current Phase. Please see Chapter 8 Hydrology and Hydrogeology for further details.

Remedial Phase

Following the implementation of the proposed Cutaway Bog and Decommissioning and Rehabilitation Plans, the bogs will be wetter, retain more water, re-colonise with vegetation slowly, and they will eventually become naturally functioning peatlands with much-reduced silt and nutrient output. As such, bog rehabilitation during the Remedial Phase will result in a long term, slight, positive residual effect on population and human health due to water quality. Please see Chapter 8 Hydrology and Hydrogeology for further details.

Population and Human Health and Archaeology and Cultural Heritage

Peat Extraction Phase (July 1988 – June 2020)

Bord na Móna (the Applicant) has a long-established history demonstrating its understanding, appreciation and commitment to the preservation and protection of Ireland's archaeological heritage for future generations. Since the 1940s, the Applicant has worked with the Commission of Public Works to ensure onsite best practise measures pertaining to the identification, handling and recording of potential archaeological finds. Since the 1980s, the Applicant has been working with the National Museum of

Ireland, the National Monuments Service and the relevant governmental departments overseeing heritage to ensure the appropriate handling of any potential archaeological finds across their bogs in order to preserve and protect Irelands material culture and heritage for posterity. Since 1998, Bord na Móna has a statutory duty under the *Turf Development Act 1998* (section 56) to afford appropriate protection for the environment and the archaeological heritage. At the same time Bord na Móna, the Minister for Arts, Heritage and the Gaeltacht and the National Museum of Ireland produced the *Agreed Principles for the Protection of Wetlands Archaeology in Bord na Móna Bogs* (1998) which set out 10 standards within which archaeology in the Bord na Móna peatlands were managed. The Applicant's peat extraction operations and potential for impact on archaeology at the Application Site has been governed by the 2012 Code of Practice agreed between the then Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna.

Since 1988, there has been one substantial find at the Application Site. Partial human remains consisting of a torso, head and upper arms were recovered at Bord na Móna's Ballivor Works in 2003. The peat extraction process had a direct negative effect on the human remains; however, the overall significance of effects is considered to be moderate as the remains have been retrieved, studied and are now on display in the National Museum of Ireland. In addition to the bog body, several finds identified by Bord na Móna employees at the Application Site prior to 1988 (such as a bronze bell, a leather shoe, a bronze sword, bronze spearhead), were issued to the National Museum for study and display as part of the Nations heritage. In 2005, the Ballivor Bog Group was selected to be part of the Archaeological Peatland Surveys of Ireland. The surveys were undertaken to facilitate the identification of any finds, features or deposits on either the peat fields, or along drain sections which would have led to mitigatory investigations and excavations in selected areas within the bog. No finds were discovered during these surveys.

Overall, it is possible that significant negative effects could have taken place to sub-surface finds and features, in particular, prior to 2005 where remains existed. This negative effect would have been mitigated by Peatland Surveys from 2005 onwards as well as the introduction of the 2011 Code of Practice. In this regard it is considered that that residual effects on sub-surface finds and features from 2005 to 2020 were Slight to Moderate while residual effects between 1998 and 2005 may have been Moderate to Significant.

Part of the Applicant 's permanent narrow gauge railway line within the townland of Grange More, is noted for its social and technical importance and was afforded protection status in 2004. This track was first laid down in the 1950s and facilitated the transport of extracted peat to the processing centre at the Ballivor Bog Works. This permanent track was not impacted by the peat extraction activities and all ancillary works and remains *insitu* to this day.

Please see Chapter 13 Archaeology and Cultural Heritage for further details.

Current Phase (June 2020- Present Day)

In terms of archaeology, architecture and cultural heritage, since peat extraction has ceased, it is considered that no direct effects would occur during the Current Phase. No direct effects as a result of removal of stockpiled peat, EPA monitoring activities, etc are identified. Since no effects were identified without the need for control measures, no residual effects will occur.

Remedial Phase

Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect. Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works. In this regard the potential residual effect on sub-surface archaeology, if present, may be Slight-Moderate.

There is no potential for the Remedial Phase to impact the permanent railway infrastructure in townland of Grange More.

Population and Human Health and Material Assets

Peat Extraction Phase (July 1988 – June 2020)

Peat extraction activities and all ancillary works at the Application Site would have generated additional traffic onto public roads through the delivery of peat from the Application Site to various end users around the country. Vehicles transporting peat had the potential to emit dust and soil roads. Rail passings of laden and unladen wagons were required to cross the public road network potentially impacting traffic flow and could have caused accidents. The addition of traffic on the road and potential for traffic disruption due to rail car passings during the Peat Extraction Phase is considered to have had a long term, imperceptible, negative residual effect.

The Peat Extraction Phase generated hazardous and non-hazardous waste which was removed from site by licenced contractors. Since 2000, the Application Site has been under IPC Licence which requires all waste to be measured, categorised, recycled and reused where possible and disposed via licenced facilities. The Peat Extraction Phase had a long-term slight negative residual impact on population and human health due to waste management. Please see Chapter 14 Material Assets for further details.

Current Phase (June 2020- Present Day)

Traffic volumes generated by the Current Phase are significantly lower than during the Peat Extraction Phase due to the cessation of peat extraction and therefore are considered to be a short-term, imperceptible, negative residual impact on local roads and road users.

Condition 7 of the IPC Licence which addresses waste management continues to be implemented by the Applicant across the Derrygreenagh Bog Group, in which the Application Site is located. The Current Phase has a short-term, slight negative residual impact on population and human health due to waste management. Please see Chapter 14 Material Assets for further details.

Remedial Phase

Bog rehabilitation during the Remedial Phase will result in a short term, negative, imperceptible, residual impact on local roads and road users.

Furthermore, waste will be limited to the general food and paper waste the environmental monitoring staff produce which will be taken off site by each member and recycled where possible. The residual effect of the Remedial Phase activities on waste management is considered to be a long term imperceptible negative effect. Please see Chapter 14 Material Assets for details.

Population and Human Health and Landscape and Visual

Peat Extraction Phase (July 1988 – June 2020)

A vast majority of the Application Site was subject to peat extraction in 1988 and the greatest landscape and visual effects had already occurred prior to the 1988 baseline. No significant landscape and visual effects occurred in these areas during the Peat Extraction Phase. The greatest landscape and visual effects during the Peat Extraction Phase occurred at the west of Bracklin Bog and east of Carranstown Bog where the lands were stripped, and industrial peat extraction occurred. Significant landscape effects occurred here where a substantial change occurred within the landscape; these drained peatlands of medium sensitivity transitioned to a landscape of bare cutover peat. Considering the absence of visibility of these peatlands from any high sensitivity visual receptors due to a high level of screening around the bogs, residual visual effects were deemed to be of moderate significance.

Current Phase (June 2020- Present Day)

Cessation of peat extraction activity in 2020 has enabled the landscape of the Application Site to continue to re-vegetate and to some degree mitigate landscape and visual effects over time. However, the landscape is still a degraded bare – cutover peat site of low sensitivity, and it is not a functioning wetland. Revegetation has caused both a slight degree of change to the landscape and slight degree of change to the visual aesthetic of the Application Site and surrounding visual amenity. Decommissioning activities are on-going causing slight landscape and visual effects to arise. On balance landscape and visual effects during the Current Phase are deemed to be not significant.

Remedial Phase

The primary activity of the Remedial Phase is to rewet cutover peatland in order to re-establish a naturally functioning wetland and peatland ecosystem. It is likely that the works required to decommission peat extraction infrastructure and implement the remedial phase will cause temporary, negative landscape and visual effects of imperceptible significance. With the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, there will be a slight positive landscape and visual impact when compared to the 1988 baseline. Please see Chapter 12 Landscape and Visual Impact for details.

16.2.2 Biodiversity

Biodiversity and Land, Soils and Geology

Peat Extraction Phase (July 1988 – June 2020)

By July 1988, peat extraction and all ancillary activities were well established across all bogs except Lisclogher West and portions of Carranstown and the western portion of Bracklin. Continued extraction from July 1988 to June 2020 is considered to have had a long-term, slight, negative effect on cutaway habitats as they were already modified but were impeded from natural vegetation succession. The Peat Extraction Phase would have had a long-term, negative impact on habitat loss/degradation for fauna and bird species. No significant adverse impacts on Designated Sites due to the Peat Extraction Phase have been identified. Please see Chapter 6 Biodiversity for further detail.

Current Phase (June 2020- Present Day)

Due to the limited activities on site during the Current Phase, impacts on habitats, fauna, bird species and Designated Sites have been reduced. There has been no additional loss, degradation or fragmentation of habitat as a result of the Current Phase of the Project and therefore, there are no residual significant effects on any habitat are likely to have occurred during this period.

Remedial Phase

With the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans during the Remedial Phase, it is anticipated that the combination of natural recolonisation and rehabilitation measures e.g. drain blocking and cell bunding, will result in environmental stabilisation through vegetation development. Rehabilitating bogs formerly subject to industrial peat extraction will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog. The implementation of the proposed rehabilitation plans will have an overall long-term, significant, positive effect on habitats, fauna, birds, water quality and aquatic fauna. Chapter 6 Biodiversity and Chapter 7 Land Soil and Geology for details.

Biodiversity and Water

Peat Extraction Phase (July 1988 – June 2020)

It is likely that peat extraction activities and all ancillary works would have resulted in indirect effects on receptors within and downstream of the Application Site in the form of water pollution. Drainage and peat extraction could also have resulted in the potential for increased release of peat solids to watercourses within and downstream of the site due to the lowering of the water table and drying out of peat. In addition, the release of dissolved nutrients, principally ammonia, resulting from the rapid breakdown of organic matter within peat once exposed to air, could also have resulted in deterioration of water quality of watercourses within and downstream of the site. This effect has the potential to lead to long-term, negative biodiversity and ecological effects downstream.

Improved sediment control measures were installed at the site in the late 1990s and early 2000s. Since 2000, the Application Site has operated under IPC Licence and has been subject to the conditions of that licence which include emission limit values for suspended solids and other nutrients. It is considered that there has been a long-term, moderate, negative residual effect on biodiversity due to downstream surface water quality as a result of release of suspended solids during the Peat Extraction Phase.

Current Phase (June 2020- Present Day)

Following review of the Annual Environmental Reports included in Appendix 4-3, there has been no significant fuel spills or wastewater discharges during the Current Phase. No significant residual effects are likely to have occurred during this period.

Remedial Phase

Following the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, the bogs will be wetter, through drain blocking measures and will recolonise with vegetation slowly, eventually become naturally functioning peatlands with much-reduced silt and nutrient output. As such the residual effects of the implementation of the rehabilitation plans is a long term, moderate positive effect on biodiversity due to downstream surface water hydrology and water quality and aquatic receptors. Please see Chapter 6 Biodiversity and Chapter 8 Hydrology and Hydrogeology for further details.

Biodiversity and Air Quality and Climate

Peat Extraction Phase (July 1988 – June 2020)

The Extraction Phase would have resulted in dust and CO_2 emissions into the atmosphere which can have an indirect long-term, negative impact on fauna, aquatic fauna and Designated Sites.

There was an overall medium risk of dust impacting vegetation within a section of the River Boyne and River Blackwater SAC to the direct north-east of the Application Site. Dust emissions from peat extraction activities and all ancillary works were long-term, localised, negative and imperceptible.

Since 2000, all operations have been licenced under IPC Licence and have been subject to the conditions of the IPC Licence including environmental monitoring of emissions to air and water. As part of the IPC Licence for the site a number of dust control measures were required to be implemented. In addition, dust monitoring was required to ensure dust emissions were not causing issue at nearby sensitive receptors.

As such, the peat extraction activities and all ancillary works had a long-term, localised, negative and imperceptible residual impact on biodiversity due to air quality and climate.

Current Phase (June 2020- Present Day)

Dust monitoring results available for the period 2000 – 2021 indicate there were no exceedances of the emission limit value of 350 mg/m^2/day at the monitoring location on site and therefore dust emissions were not causing a nuisance in the area. In addition, there is no history of complaints in relation to dust emissions. During the Current Phase, the potential for dust emission impacts on habitats, aquatic habitats and Designated Sites is reduced considerably due to the cessation of peat extraction. As peat extraction has ceased at the Application Site, carbon losses associated with peat removal and the subsequent impact to climate are not relevant to the Current Phase. Emissions from vehicles accessing the Application Site will be minimal in nature and will result in a short-term, negative and imperceptible impact to biodiversity due to air quality and climate.

Remedial Phase

With the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, the bogs will be set on a pathway to potential formation of carbon sinks creating a long term positive impact on fauna, aquatic fauna. This is considered to be a long term, slight positive effect on biodiversity due to air and climate. Please see Chapter 9 Air Quality and Chapter 10 Climate for further details.

Biodiversity and Noise and Vibration

Peat Extraction Phase (July 1988 – June 2020)

Plant machinery and transport vehicles used during the Peat Extraction Phase would have given rise to noise emissions that could be a nuisance for fauna, thereby having a long term, slight, negative effect. Likewise, the laying down and regular movement of railway infrastructure could have had a long term, slight, negative effect on habitats and fauna due to noise and vibration.

Current Phase (June 2020- Present Day)

Noise, generated from plant use during the Current Phase are significantly reduced and are considered to have a negative, not significant and short-term impact on biodiversity.

Remedial Phase

Once the drain blocking measures listed within the Cutaway Bog Decommissioning and Rehabilitation Plans of the Remedial Phase have been completed, the removal of noise sources is considered to have a long-term, positive effect on fauna and bird species. There will be no requirement to move or use railway infrastructure during this phase. Please see Chapter 6 Biodiversity, Chapter 11 Noise and Vibration for details.

Biodiversity and Landscape and Visual

Peat Extraction Phase (July 1988 – June 2020)

By July 1988, the majority of the Application Site was cleared of vegetation and undergoing industrial peat extraction. Alteration to the drainage regimes had an impact on the wetland habitat and the species assemblages present, consequently resulting in very minor change to the ground cover of bogland habitat and therefore an indirect effect on the landscape as well. Significant landscape effects occurred here where a substantial change occurred to habitats; these drained peatlands of medium sensitivity transitioned to a landscape of bare cutover peat. Considering the absence of visibility of these peatlands from any high sensitivity visual receptors due to a high level of screening around the bogs, residual visual effects were deemed to be of Moderate significance.

Current Phase (June 2020- Present Day)

Since the cessation of peat extraction in June 2020, bog habitats have started to recover, particularly around the edges of the bogs. Revegetation has caused both a slight degree of change to the landscape and slight degree of change to the visual aesthetic of the Application Site and surrounding visual amenity. Revegetation has caused both a slight degree of change to the landscape and slight degree of change to the visual aesthetic of the Application Site and surrounding visual amenity. Decommissioning activities are on-going causing slight landscape and visual effects to arise. On balance landscape and visual effects during the Current Phase are deemed to be not significant.

Remedial Phase

The enhanced revegetation of the site associated with the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans will have a permanent, slight positive effect on habitats, landscape character and visual amenity of the site. Please see Chapter 12 Landscape and Visual Impact for details.

16.2.3 Land, Soils and Geology

Land, Soils and Geology and Water

Peat Extraction Phase (July 1988 – June 2020)

Drainage was inserted to varying degrees across all the bogs within the Application Site by 1988. After this, there would have only been minor annual changes in local bog hydrology and hydrogeology associated with the annual removal of peat and the deepening of drains, if required. The effect of continuing peat extraction activities until June 2020 would not have resulted in any major alteration of the local hydrogeological regime. Therefore, the residual effect of the Peat Extraction Phase has had a permanent, moderate, negative direct effect on the bog hydrogeology. Sediment control measures have been in place since 1983/1984 (i.e. before the 1988 baseline) and water quality discharge licence limits have been in place since 2000 in accordance with IPC licensing.

The available monitoring data indicate that the baseline water quality was reasonably good and has not changed significantly during the Peat Extraction Phase. The effect on surface water quantity in downstream surface watercourse are not likely to be significant. The drainage systems were designed to reduce runoff to greenfield runoff rates. The residual effect is considered to be indirect, long-term moderate and negative on downstream surface water quality and quantity.

Current Phase (June 2020- Present Day)

No significant effects on bog hydrogeology will have occurred during the Current Phase. By June 2020, all drainage infrastructure (field drains, main drains, silt ponds etc.) would have been in place across the Application Site for between 25 – 70 years. The hydrogeological regime would have been well established with field drains lowering the perched groundwater table in the adjacent former peat production fields. Therefore, the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on bog hydrogeology.

No significant effects on downstream surface water hydrology will have occurred from the cessation of peat extraction in June 2020 to the present day. Therefore, the residual effect is a neutral, imperceptible, short-term, indirect, unlikely effect on downstream surface water hydrology.

Remedial Phase

With the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans during the Remedial Phase, the bogs will likely be wetter, they will retain more water and will recolonise with vegetation slowly. They will eventually become naturally functioning peatlands/wetlands with much-reduced silt and nutrient output. As such, the residual effects of the Remedial Phase are long-term

moderate, positive on local peat bog hydrology/hydrogeology, and long-term slight, positive on downstream receptors such as Designated Sites. Please see Chapter 8 Hydrology and Hydrogeology for further details.

Land, Soils and Geology and Archaeology and Cultural Heritage

Peat Extraction Phase (July 1988 – June 2020)

As discussed above, partial human remains consisting of a torso, head and upper arms were recovered at the Applicant's Ballivor Works in 2003. The peat extraction process had a direct negative effect on the human remains; however, the overall significance of effects is considered to be Moderate as the remains have been retrieved, studied and is now on display in the National Museum of Ireland. Overall, it is possible that significant negative effects could have taken place to sub-surface finds and features, in particular, prior to 2005 where remains existed. This negative effect would have been mitigated by Peatland Surveys from 2005 onwards as well as the introduction of the 2011 Code of Practice. In this regard it is considered that that residual effects on sub-surface finds and features from 2005 to 2020 were Slight to Moderate while residual effects between 1998 and 2005 may have been Moderate to Significant. Please see Chapter 13 Archaeology and Cultural Heritage for further details.

Part of the Applicant's permanent narrow gauge railway line within the townland of Grange More, is noted for its social and technical importance and was afforded protection status in 2004. This track was first laid down in the 1950s and facilitated the transport of extracted peat to the processing centre at the Ballivor Works. This permanent track was not impacted by the peat extraction activities and all ancillary works and remains *insitu* to this day.

Current Phase (June 2020- Present Day)

In terms of archaeology, architecture and cultural heritage, since peat extraction has ceased, it is considered that no direct effects would occur during the Current Phase. No direct effects as a result of removal of stockpiled peat, EPA monitoring activities, etc are identified. Since no effects were identified without the need for control measures, no residual effects will occur.

Remedial Phase

Remedial activities such as drain blocking or tracking over peat fields may have a negative effect on any sub-surface archaeological finds or features that may be present on or beneath the surface of the peat. This may result in a permanent, negative and significant effect. Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works. In this regard the potential residual effect on sub-surface archaeology, if present, may be Slight-Moderate.

There is no potential for the Remedial Phase to impact the permanent railway infrastructure in townland of Grange More.

Please see Chapter 13 Archaeology and Cultural Heritage for further details.

Land, Soils and Geology and Landscape and Visual

Peat Extraction Phase (July 1988 – June 2020)

As discussed above, significant landscape effects occurred here where a substantial change occurred within the landscape; these drained peatlands of medium sensitivity transitioned to a landscape of bare cutover peat.

Current Phase (June 2020- Present Day)

Cessation of peat extraction activity in June 2020 has enabled the landscape of the Application Site to continue to re-vegetate and to some degree mitigate landscape and visual effects over time. However, the landscape is still a degraded bare – cutover peat site of low sensitivity, and it is not a functioning wetland. Revegetation has caused both a 'Slight' degree of change to the landscape and 'Slight' degree of change to the visual aesthetic of the Application Site and surrounding visual amenity. Decommissioning activities are on-going causing 'Slight' landscape and visual effects to arise. On balance landscape and visual effects during the 'Current Phase' are deemed to be 'Not Significant'.

Remedial Phase

The primary activity of the Remedial Phase is to rewet cutover peatland in order to re-establish a naturally functioning wetland and peatland ecosystem. It is likely that the works required to decommission peat extraction infrastructure and implement the remedial phase will cause temporary, negative landscape and visual effects of 'Imperceptible' significance. With the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, there will be a 'Slight Positive' landscape and visual impact when compared to the 1988 baseline. Please see Chapter 12 Landscape and Visual Impact for details.

Land, Soils & Geology and Air Quality and Climate

Peat Extraction Phase (July 1988 – June 2020)

Control measures implemented through the IPC Licence in 2000 specifically pertain to preventing the erosion of exposed peat by both wind and water and therefore aim to protect air quality during the Peat Extraction Phase. As such the residual effect is permanent, moderate, negative on air quality and climate due to peat subsoils at the Application Site.

Current Phase (June 2020- Present Day)

With the implementation of the dust control measures stipulated withing the IPC licence for the Application Site, dust emissions associated with the Current Phase will be imperceptible. As such, a short term, imperceptible negative effect occurs on land soils and geology due to air quality and climate. Please see Chapter 9 Air Quality and Chapter 10 Climate for details.

Remedial Phase

The Remedial Phase involves implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans. The primary activities will involve re-vegetation of the Application Site, drain blocking and re-wetting of the bogs where possible which will aid in restoring the carbon store function and promote the carbon sink potential of the land. Ongoing monitoring of the Application Site will continue to ensure stabilisation of the Application Site and complete re-vegetation. Residual impacts to air quality and climate during the Remedial Phase will be short-term, neutral and imperceptible. Please see Chapter 9 Air Quality and Chapter 10 Climate for details.

16.2.4 Vulnerability to Natural Disasters

As described in Chapter 15 of the rEIAR, major accidents or natural disasters are hazards which have the potential to affect any stage the Project and can lead to environmental effects both directly and indirectly. These include accidents during the Peat Extraction Phase, Current Phase and Remedial Phase caused by events such as operational failure and/or natural hazards. The assessment of the potential for significant accidents or disasters is conducted in connection with the information that must be included in the rEIAR. This includes aspects such as population and human health, biodiversity, land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage and the landscape. The risk of a major accident and/or disaster during the Peat Extraction Phase, Current

Phase and Remedial Phase is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).

When all control and mitigation measures detailed in the rEIAR are implemented, the residual effect(s) associated with the Extraction Phase, Current Phase and Remedial Phases at the Application Site are not significant. Please see Chapter 15 for details.

16.3 Residual Impacts

Where any potential interactive negative effects have been identified in the above, a full suite of appropriate control measures and mitigation measures has already been included in the relevant sections (Chapters 5 – 15) of the EIAR and are detailed in Chapter 17 of this rEIAR. The implementation of control and mitigation measures have been reduced, will reduce or remove the potential for their effects. Information on potential residual impacts and the significant of effects, is also presented in each relevant chapter.

17. SCHEDULE OF MITIGATION

17.1 Introduction

All control measures that have been implemented at the Application Site from 1948 at the onset of site preparation up to July 1988, control and monitoring measures implemented from July 1988 to the cessation of peat extraction in June of 2020, control and monitoring measures implemented during the management of the Application Site since June 2020 and the mitigation measures proposed for the activities intended to be carried out at the Application Site into the future are set out in the relevant chapters of this rEIAR.

All control and mitigation measures for the Project are presented in Table 17-1 below. The measures have been grouped together according to the relevant phase of the Project. The Project formed part of an overall development at the Application Site which commenced many years prior to July 1988. For completeness, measures undertaken from 1948 at the onset of preparation works up to July 1988 are also presented below in Table 17-1. As such the measures are grouped under the following headings:

- **Pre-July 1988:** activities employed at the Application Site from 1948 at the onset of preparation works up to July 1988.
- **Peat Extraction Phase:** peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in June of 2020 (July 1988 – June 2020).
- **Current Phase:** the management of the Application Site since June 2020 (June 2020 to present).
- **Remedial Phase:** the activities intended to be carried out at the Application Site into the future.

Table 17-1 Historical and Current Control Measures, and Proposed Mitigation Measures at the Application Site

Pre July-1988				
Control Measures Pre-July 1988 as per Section 4.3.5 in Chapter 4 of the rEIAR				
Measure	**Location in rEIAR**	**Receptor**	**Control Measure**	**Impact**
Emissions Control (dust, noise, water, silt run off)	Section 4.3.5.1 Chapter 4	Surface and ground water, Residential receptors, Habitats, aquatic species, Traffic users	**Peat Harvesting Machinery – maintenance programmes and storage:** 1. A range of peat harvesting machinery listed in Section 4.2.2.1 of **Chapter 4 Description of Development** were stored at the Ballivor Works at the end of the workday. 2. All machinery were regularly inspected serviced and maintained; 3. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release; and, 4. Self-contained machine parts washer was located at the Workshop.	Containment of dust, surface and groundwater emissions, traffic disruption/soiled roads, Minimisation of fuel leak/groundwater contamination
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety**	Section 4.3.5.2 Chapter 4	Surface and ground water, Residential receptors, Habitats, aquatic species	**Refuelling Facilities:** Refuelling and maintenance of all vehicles was undertaken at the Works. When machinery required refuelling on the Application Site, it was done so by a bunded mobile (rail or tractor transport) fuelling unit which travelled out from the Ballivor Works to the bogs across the Application Site where the machinery was located. The following emergency action procedure was implemented at the Application Site prior to IPC licencing (pre-2000) and was recorded as part of the IPC Licence application process: 1. When a spill occurs, the General Manager must be immediately informed of the incident;	Containment of dust, surface and groundwater emissions, traffic disruption/soiled roads,

Terrestrial Habitat protection **Aquatic habitat protection**			2. The spill must be assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences; 3. If there is a risk of explosion, all personnel in the area must be evacuated from the area; 4. The spill should be sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%); 5. All effort should be made to prevent the spill from entering a storm drain or nearest outfall; 6. Once the spill has been contained, a suitable absorbent (dry peat) is to be used to soak the spillage; 7. 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; 8. Follow up action measures taken must include the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and, 9. In the event of a significant spillage, the General Manager must notify the local authority.	Minimisation of fuel leak/groundwater contamination
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5.3 Chapter 4	Surface and ground water, Residential receptors, Habitats, aquatic species Bord na Móna Employees	**Fire Safety:** 1. Annual training provided for bog fires crew and factory personnel and all general staff are provided with a minimum of 2 hours training in fire prevention; 2. Fire exits should be designated. These doors should be fitted with push-bar mechanisms only and lighted form independent sources. They shall be unobstructed inside and outside at all times and open outwards; 3. Each canteen/office equipped with a fire blanket and fire extinguisher; 4. There should be at least 1 fire point at all office premises; 5. Petrol and other oils should only be stored in designated oil stores; 6. Batteries should not be charged in working areas unless suitable protection is provided; 7. Training provided for Oxygen cylinder storage and use; 8. Fire Wagons: Designated rail wagons for fire prevention which contain: hoses, shovels, fire beaters, baskets, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers etc.; 9. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat. This prevented spontaneous combustion of certain peat types by excluding air as much as possible; and, 10. Fire Safety Audits undertaken at six monthly intervals along with random audits. Yearly assessments of all audits	Prevention/minimisation of environmental impacts by dust and pollutant release to air Prevention/minimisation of environmental impacts dust and pollutant release to surface waters Prevention/minimisation of impacts to human health

				by personal injury Prevention/minimisation of impacts to human health from dust and air pollutant emissions
Emissions Control (dust, noise, water, silt run off) **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5.4 Chapter 4	Surface and ground water, Residential receptors, Habitats, aquatic species	**Dust management at boundaries of the bogs and headlands:** Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. Tree cover along the fringes of bogs minimised the amount of dust that would travel off-site. In 1976 Bord na Móna established a policy to preserve the vegetation and tree cover on all bog fringes and on any mineral islands. (Brown Gold 'A History of Bord na Móna and the Irish Peat Industry', 2010 Clarke, Donal, Chapter 10 Pg 206). In addition, the following measures were undertaken at a minimum to minimise dust emissions and later expanded under IPC licence. 1. Stockpiles were compacted on either side by large rollers drawn by 65H.P tractors; 2. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat; 3. Avoid extraction during windy weather; 4. Keep headlands clean- remove loose peat; 5. Drive slow along dusty headlands; and, 6. Clean road crossing.	Prevention/minimisation of environmental impacts by dust and pollutant release to air Prevention/minimisation of environmental impacts dust and pollutant release to surface waters Prevention/minimisation of impacts to human health from dust and air pollutant emissions

Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5.5 Chapter 4	Surface and ground water, Bord na Móna Employees Residential receptors	**Internal rail network maintenance** Railway tracks and railway locomotives underwent continuous inspection and maintenance to prevent de-railments, fires, accidents and fuel leaks. The locomotives were fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Wagons were also designate as fire safety wagons and were stocked with various fire safety paraphernalia including hoses, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers.	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air
Emissions Control (dust, noise, water, silt run off) **Health and Safety**	Section 4.3.5.6 Chapter 4	Surface water Habitats, aquatic species Residential receptors	**Surface Water Management** 1. Onsite water emission from workshop and hard standing areas drained via onsite surface water drainage systems implemented as part of building and hardstand construction over the decades, into adjacent peatlands surface water drainage network; and, 2. All machinery were regularly inspected, serviced. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release.	Containment of dust, surface and groundwater emissions Minimisation of fuel leak/groundwater contamination

Terrestrial Habitat protection **Aquatic habitat protection**			Formal silt control measures adopted in 1974 are outlined below under Silt Management.	
Emissions Control (dust, noise, water, silt run off) **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5.7 Chapter 4	Surface water Habitats, aquatic species/habitats	**Maintenance Programme for Internal Drains** 1. Internal drains cleaned on a regular basis in suitable weather. This was necessary to remove sludge from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field. 2. Drain maintenance was carried out using draglines and excavators 3. These works were programmed to ensure that the drainage servicing the harvesting areas were fit for purpose. 4. Visual inspection of pumps daily 5. Operational check of pumps biweekly 6. Service of pumps monthly 7. Drain maintenance was carried out mainly prior to and post the harvesting season	Containment/minimisation silt run off
Emissions Control (dust, noise, water, silt run off) **Health and Safety**	Section 4.3.5.8 Chapter 4	Surface water Habitats, aquatic	**Maintenance Programme for Onsite Surface Water Pumps** 1. Visual inspection of pumps daily; 2. Operational check of pumps biweekly; and, 3. Service of pumps monthly	Containment/minimisation silt run off

Terrestrial Habitat protection **Aquatic habitat protection**		species/habitats		
Emissions Control (dust, noise, water, silt run off) **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5.9 Chapter 4		**Silt Management** As part of the Third Development Programme in the 1970s, Bord na Móna decided in 1974 to control all effluent by means of specially designed and constructed silt ponds, thereby trapping more than 90% of the suspended solids present in the drainage water. A silt committee was set up in October 1975 to study the feasibility of removing silt from the bog effluents. Recommendations of an interim report prepared by the committee in 1975/1976 were as follows: 4. Provision of silt ponds should be a basic feature of new bog development for milled peat and their construction should be planned for all outlet systems; 5. Ideally, silt ponds should be located in cutaway bog; 6. Sufficient area should be acquired at the initial stage to provide for silt ponds; 7. In production bogs, existing large catchments should be broken up into manageable proportions and ponds constructed to accord with local topography; 8. Revision of drainage techniques should be considered such as arranging flatter gradients in external and internal outfalls and extending their width and length in the lower reaches to encourage settlement of silt; 9. Initial drainage effluent should be allowed to spill over face banks (where practicable) until adequate silt ponds have been provided. This should be applied to all new bog development immediately. Similarly, growth and vegetation should not be removed from external outfalls until interference with drainage and/or complaints force us [Bord na Móna] to act; 10. It is recommended that catchments to be protected by silt ponds should not be greater than 500 acres;	Containment/minimisation silt run off

			11. Ponds should be designed for maximum run-off of 1 cubic foot per minute per acre and run-off controlled by provision of small diameter culverts, weirs or sluices; 12. For milled peat, 50 square foot of pond per acre of catchment. For 500 acres, 45-foot-wide x 555-foot long x 7-foot deep, i.e., 6-foot maximum of silt and 1 foot minimum of water; 13. Ponds should be provided in pairs each sufficient for the catchment protected; 14. Ponds should be cleaned out at regular intervals as required but at least four times a year using dragline or Hymac retained permanently for this purpose. Investigations to be made into the suitability of pumping units; 15. Second parallel pond should be used during excessively large water flow (storm water); and, 16. The problem of discharging into the Clodiagh River at Monettia [County Offaly] has become difficult in view of ESBs requirement that the entire river be kept free of silt. Silt ponds will be essential and provision should be made in their layout to allow for further extension of the ponds if decantation needs to be improved further. 17. A copy of a memo sent to Ballivor Works from the Bord na Móna Production Manager in March 1976 setting out the recommendations of the silt committee is included in Appendix 4-8, which directs that "at all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended". Further Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980s in response to the 1977 Water Pollution Act. 18. Silt ponds were installed to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated from the production fields and collected in the bog drainage network as well as run-off from workshop areas. Silt ponds were designed and constructed, primarily, with a width of 8m, however, in some cases, silt ponds of up to 12m in width were constructed. The larger silt ponds up to 12m wide are only provided in areas where access is available to both sides of the silt ponds for cleaning. The length of the silt pond varies depending on the capacity required (i.e., the length is proportional to the area of catchment being drained). In some locations, baffles (i.e., obstructing panels or vanes) have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. Silt ponds are generally excavated to a depth of 1.5m below the pipe invert level, however in some locations, due to restricted space, the silt pond depth is greater than this. Low-velocity flow through the silt pond is generally controlled by inlet and outlet pipes at the silt ponds or upstream	

			of the silt pond. These pipes control the velocity of the flow into and out of the silt ponds so that the velocity within the silt pond itself is less than 0.1 m/sec. This slow flow through the pond allows suspended sediment (mainly peat) particles to fall out of suspension and build up on the base of the pond, thereby reducing the sediment loading of the outflow from the pond. The principle behind the design of the silt ponds is an application of Stoke's Law. Stokes' Law describes how small solid particles move through a viscous fluid, stating that the drag force on these particles is directly proportional to their size, velocity, and the fluid's viscosity. The silt ponds are cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points to the adjacent surface watercourse. Access to the silt ponds is via headlands and machine passes which were created to facilitate vehicle movements within the site. Other records of Silt Committee meetings in April 1984 (which are included in Appendix 4-8) set out acceptable standards of effluent and note a decision from ABP on a licence for effluent from the Littleton Briquette Factory in County Tipperary, which set an upper limit of 100mg/l for suspended solids. The records note that *"although the legalities regarding obligation to treat bog effluent and briquette factory effluent may be dissimilar the waste involved is similar. It would, therefore, seem reasonable to assume that a target value of 100mg/l in the case of bog effluent would satisfy potential complainants whose complaints are based on genuine dissatisfaction with the present standard of our* [Bord na Móna] *effluents".* These records are evidence of early control measures implemented across the Bord na Móna landbank, including the Application Site, to control sediment levels in effluent.	
Emissions Control (dust, noise, water, silt run off) **Health and Safety**	Section 4.3.5.10 Chapter 4 Appendix 4-8	Surface and ground water, Residential receptors, Employees,	**Waste Management** 1. Waste oils and break fluids drained from machinery during servicing were collected in drums and emptied to a designated waste oil storage tank; 2. Waste oil storage tank contents transported off-site by a licenced waste disposal contractor. 3. Oil and fuel filters changed at vehicle service intervals; 4. Spent filters collected and disposed thorough a waste disposal contractor; 5. Used batteries are collected by battery collection contractor;	Containment of dust, surface and groundwater emissions, Minimisation of fuel

Terrestrial Habitat protection **Aquatic habitat protection**		Bog Habitats Aquatic species	6. Off-washings form the self-contained machine parts washer was collected within a sludge tank at the Works; 7. Ash from the onsite boiler was stored in a skip onsite and collected by a licenced contractor and taken to landfill; 8. Waste polythene removed from stockpiles was collected at the roadside by plastic recycling company; and, 9. Workshop waste and general refuse from canteens/offices were historically burned on site or disposed into waste disposal areas at the Works. This practise changed to the use of skips which were then collected by licenced contractors.	leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air
Archaeological Preservation	Section 4.3.5.11 Chapter 4	Unrecorded subsurface Archaeology	**Archaeological Disturbance** 1. As part of peat processing training, all bog employees must read and adhere to the recommendations 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942; and, 2. All bog workers must stop all works and report to the Bog Manager if archaeological finds are encountered. If materials thought to be of archaeological interest are encountered, the Bog Manager must report the findings to the Garda Síochána within 7 days who will then contact the Commissioner of Public Works.	Minimisation/prevention of subsurface archaeological destruction, loss or interference through drainage and extraction operations and/or failure to recognise/report finds.

Peat Extraction Phase (July 1988 – June 2020)				
Control Measures July 1988 to June 2000 as per Section 4.6 in Chapter 4 of the rEIAR				
Discipline	**Location in rEIAR**	**Receptor**	**Control Measure**	**Impact**
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Section 4.3.5 in Chapter 4 Section 4.6 in Chapter 4 Appendix 4-8 Appendix 4-9 Chapters 4 to 15	Surface and ground water, Residential receptors, Habitats, aquatic species, Traffic users Bord na Móna Employees Residential receptors Bog Habitats	Post-July 1988 but prior to the implementation of the IPC Licence at the Application Site in 2000, the environmental management measures set out in Section 4.3.5 in Chapter 4 or the rEIAR and detailed above in Pre-July 1988 were in place across the Application Site. In addition, as evidenced in the 1991 Harkins Report, Appendix 4-9, silt control measures in the form of silt ponds were in place prior to 1988, with Bord na Móna carrying out further studies and surveys throughout the 1980s and 1990s to make improvements to how silt ponds operated so that suspended solids emissions in surface run-off were reduced. This included the construction of new ponds (as described in Section 4.3.5.9) to maintain treatment of run-off while cleaning of existing ponds was in progress.	Containment of dust, surface and groundwater emissions, traffic disruption/soiled roads, silt run off Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts by dust

				and pollutant release to air Prevention/mini misation of environmental impacts dust and pollutant release to surface waters Prevention/mini misation of impacts to human health by personal injury Prevention/mini misation of impacts to human health from dust and air pollutant emissions Prevention/mini misation of environmental impacts and human health

				impacts by fire, dust and pollutant release to air
Archaeological Preservation	Section 4.6.1 in Chapter 4 Chapter 13	Unrecorded subsurface Archaeology	**Archaeological Code of Practice** Bord na Móna has a long history of co-operation with the National Museum of Ireland, the National Monuments Service and the relevant governmental departments overseeing heritage at the time, in relation to the cultural and archaeological importance of wetlands as well as the potential for, and handling of, archaeology discovered in bogs. After the discovery and subsequent preservation of trackways at Corlea Bog, Co. Longford by Bord na Móna employees in the 1980s, a new programme for peatland archaeology was established. Since 1991 an annual programme of archaeological survey, initially funded by the National Monuments Service, has been conducted in Bord na Móna Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record. Since 1998, Bord na Móna has a statutory duty under the Turf Development Act 1998 (Section 56) to afford appropriate protection for the environment and the archaeological heritage. Section 56.- *The Company and each subsidiary shall ensure that its activities are so conducted as to afford appropriate protection for the environment and the archaeological heritage.* The 1998 Act was in accord with the development of an *Agreed Principles for the Protection of Wetlands Archaeology in Bord na Móna Bogs* (1998) between the Minister for Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna. The Agreed Principles set out 10 standards within which archaeology in the Bord na Móna peatlands were managed. Five Archaeological Liaison Officers were spread across the Bord nan Móna Bog Groups and received training on how to deal with and report finds. Since 1998, all archaeological surveys were funded by Bord na Móna. The surveys have been accompanied by an annual programme of selective	Minimisation/prevention of subsurface archaeological destruction, loss or interference through drainage and extraction operations and/or failure to recognise/report finds.

			archaeological excavation and paleo-environmental analysis. By 2013, 64,000 of the c. 80,000-hectare land holdings of Bord na Móna had been subject to archaeological survey.[1] A Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna was established in 2012.[2] This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable Bord na Móna to progress with peat extraction activities and all ancillary works and simultaneously ensure archaeological control measures are in place. The measures Bord na Móna are responsible for are listed below: *Bord na Móna will:* 1. *Engage a Project Archaeologist* 2. *Maintain the network of Archaeological Liaison Officers.* 3. *Disseminate a set of Archaeological Protection Procedures* 4. *Ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.* 5. *Ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.* 6. *Ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.* 7. *Prioritise monuments for investigation taking account of monument vulnerability, contractual obligations and peat production targets.* 8. *Prepare tenders for archaeological mitigation of impacts on monuments, to include excavation and recording, in consultation with the Project Archaeologist and the Minister.* 9. *Engage professional Consultant Archaeologists to carry out mitigation of monuments, including the required palaeo-environmental assessment and post-excavation studies.*	

[1] *Department of the Arts, Heritage and the Gaeltacht 2013 Review of Archaeological Survey and Mitigation Policy relating to Bord na Móna Peatlands since 1990. https://www.archaeology.ie/sites/default/files/media/pdf/bnm-peatland-review-final-report-20-06-2013.pdf*
[2] *2012 Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Mónahttps://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf*

			10. *Provide the necessary finance to fulfil the post-excavation requirements of the Minister and the Director including the conservation of archaeological objects and the provision of scientific analyses and dating, as well as the production of reports on all archaeological work, to a standard which will meet the approval of the Minister.*	
Peat Extraction Phase (July 1988 – June 2020)				
Control Measures 2000 to Present-Day (Post IPC Licence) as per Section 4.7 in Chapter 4 of the rEIAR				
Measure	**Location in rEIAR**	**Receptor**	**Control Measure**	**Impact**
Emissions to Atmosphere **Emissions to Water** **Waste Management** **Noise** **Water Protection** **Decommissioning and Cutaway Bog Rehabilitation**	Chapters 4–15, Appendix 4-1 IPC Licence PO 501-01	Environmental Monitoring	**Environmental Monitoring and Conditions under IPC Licence** Bord na Móna were granted an IPC Licence (P0501-01) for the Derrygreenagh Bog Group (which encompasses the Ballivor Bog Group, and therefore the Application Site) in April 2000. Following this grant, the control measures listed above have been updated and expanded. The background to the IPC Licence application and implementation at the Ballivor Bog Group can be found in Chapter 2 Background and a copy of the licence is provided in Appendix 4-1. The licence application is publicly available and can be viewed on request at EPA headquarters PO Box 3000 Johnstown Castle Estate County Wexford Y35 W821. The EPA licencing inspectors' reports can be viewed at the following webpage: https://epawebapp.epa.ie/terminalfour/ippc/ippc-view-filter.jsp?regno=P0501-01&filter=c&docfilter=go Furthermore, Bord na Móna staff underwent an EPA IPC training programme following the grant of the IPC Licence in 2000, which resulted in the development of an environmental management system. This system addresses emissions to water and air, noise, vibration and odour emissions, waste management, use of natural resources, visual effects and the natural environment and eco-system. Please see Appendix 4-5 for the Bord na Móna IPC training programme.	

			The conditions of the IPC Licence are intended for the protection of the environment and apply from the time of grant of the IPC Licence. The EPA has undertaken Technical Amendments of the IPC Licence for the purpose of aligning the conditions of the IPC Licence to the objectives of national and European environmental protection legislation enacted over the lifetime of the IPC Licence. The IPC Licence was subject to a Technical Amendment for the purpose of the European Communities Environmental Objectives (Surface Water) Regulations, 2009 and it now contains an objective to 'maintain' or 'restore' the water surface water quality to the defined 'Good Status'. With the implementation of conditions listed in the IPC Licence, the potential environmental effects of peat extraction activities and all ancillary works on water quality (such as the release of elevated concentrations of suspended sediments, and by association on aquatic ecosystems and protected species), have and continue to reduce through the implementation of IPC Licence conditions. Please see Chapter 8 Hydrology and Hydrogeology of this rEIAR and the Annual Environmental Reports (AER) included as Appendix 4-3 for details. The IPC Licence is subject to 14. No conditions pertaining to the ongoing monitoring and maintenance to ensure any emissions from site activities will comply with and not contravene, any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992 outlined below: (3) The Agency shall not grant a licence or revised licence for an activity unless it is satisfied that– (a) any emissions from the activity will not result in the contravention of any relevant air quality standard specified under section 50 of the Air Pollution Act, 1987, and will comply with any relevant emission limit value specified under section 51 of the Air Pollution Act, 1987, (b) any emissions from the activity will comply with, or will not result in the contravention of, any relevant quality standard for waters, trade effluents and sewage effluents and standards in relation to treatment of such effluents prescribed under section 26 of the Local Government (Water Pollution) Act, 1977, (c) any emissions from the activity or any premises, plant, methods, processes, operating procedures or other factors which affect such emissions will comply with, or will not result in the contravention of, any	

			relevant standard including any standard for an environmental medium prescribed under regulations made under the European Communities Act, 1972, or under any other enactment, (d) any noise from the activity will comply with, or will not result in the contravention of, any regulations under section 106, (e) any emissions from the activity will not cause significant environmental pollution, and (f) the best available technology not entailing excessive costs will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity, and, where appropriate, the Agency shall attach conditions relating to the matters specified in the foregoing paragraphs to the licence or revised licence. Conditions 1 to 4 of the licence outlined the Scope, Management, Interpretation and Notification procedures required by the Applicant, respectively. Conditions 11 to 14 detail the Monitoring (equipment use), Recording and Reporting, Emergency Response and Financial Provisions duties of the Applicant. Conditions 5 to 10 pertain to environmental monitoring and management: › Condition 5 Emissions to Atmosphere › Condition 6 Emissions to Water › Condition 7 Waste Management › Condition 8 Noise › Condition 9 Water Protection › Condition 10 Decommissioning and Cutaway Bog Rehabilitation In compliance with Condition 5, the Applicant must undertake annual tests on boiler combustion efficiency and dust monitoring. Please see Chapter 9 Air Quality for further details. Condition 6 ensures the Applicant establishes a surface water discharge monitoring programme which is reviewed annually, and a report submitted to the EPA quarterly. The Applicant is also required to submit water sample results annually, implement and maintain silt ponds. Condition 9 pertains to the 'Water Protection' and outlines the daily, weekly, monthly, quarterly, and annual inspections Bord na Móna must carry out to provide for the protection of surface and groundwater. There are currently silt pond inspections and	

			maintenance including quarterly grab sampling ongoing at the application site. Please see Chapter 8 Hydrology and Hydrogeology for further details. Condition 7 compels the Applicant to correctly dispose of waste to licenced facilities. Please see Chapter 14 Material Assets for details. Condition 8 ensures that any on site activities do not give rise to noise exceedances at noise sensitive locations. Please see Chapter 11 Noise and Vibration for further details. Condition 10 pertains to site decommissioning followed by peatland rehabilitation and is detailed in Section 4.9 below which details the Remedial Phase, and Chapter 6 Biodiversity. It is the intention of the of the Applicant to continue implementing and practising the mitigation and monitoring measures as listed in the Licence after the site is decommissioned, where applicable.	
Emissions Control (dust, noise, water, silt run off) **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapters 4–15, Appendix 4-1 IPC Licence PO 501-01	Surface and ground water, Residential receptors, Habitats, aquatic species	**IPC Licence Condition 5 Emissions to Atmosphere:** *Boiler Combustion Efficiency shall be tested annually, and results reported on annually as part of the AER. The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.* *Within three months of the date of grant of the licence, the licensee shall submit to the Agency for agreement, a proposal for the identification and monitoring of Dust Sensitive Locations (DSL's) on and off site for dust deposition. A report on this monitoring shall be submitted annually as part of the AER.* *Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].* *In relation to Dust Control the licensee shall, within six months of date of grant of this licence, develop and implement procedures to ensure that:* • *shelter belts are planted in sensitive areas,* • *harvesting in sensitive areas is avoided during windy weather,* • *where possible machinery uses grassed pathways,* • *headlands are kept clean and free of excessive loose peat,* • *stockpiles are sheeted where possible,* • *moving machinery maintains slow speeds when travelling along dusty headlands,*	Prevention/minimisation of environmental impacts by dust and pollutant release to air Prevention/minimisation of environmental impacts dust and pollutant release to surface waters Prevention/minimisation of impacts to human health from dust and air pollutant emissions

			• *when harvesting, the jib is maintained low to the stockpile,* • *shelter belts are planted around out loading facilities,* • *road transported peat is adequately covered (sheeted or similar),* • *wind breaks are planted where-ever possible.* *Reason: To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.* **Comment:** In accordance with IPC Licence requirements, Bord na Móna submit Annual Environment Reports (AER) since 2001 which include: Boiler Combustion Efficiency is tested annually, and results are detailed in the AERs a requirement of the IPC Licence › The Applicant submitted proposed Dust Sensitive Locations on and off site for dust deposition monitoring within three months of the grant date of the licence as a requirement of the said Licence › Dust sampling was undertaken annually during the Peat Extraction Phase in accordance with German TA Luft Immission Standards for Particle Deposition (IW1), the results of which were detailed in each Annual Environment Report.	

Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapters 4–9, Chapter 13 Appendix 4-1 IPC Licence 501-01	Surface water Habitats, aquatic species Residential receptors Surface water Habitats, aquatic species/habitats	**IPC Licence Condition 6 Emissions to Water:** *No specified emission to water shall exceed the emission limit values set out in Schedule 1(i) Emissions to Water subject to Condition 3 of this licence. There shall be no other emissions to water of environmental significance.* *The licensee shall within three months of date of grant of this licence submit to the Agency for approval, a proposal for a surface water discharge monitoring location programme. This programme shall, inter alia, have regard to the current status of each bogland (virgin, under development, operational or worked out), sensitivity of the receiving water, status of silt pond upgrade programme.* *This programme shall be reviewed and revised as necessary each year as part of the AER. Monitoring and analyses of each agreed emission monitoring location shall be carried out as specified in Schedule 1(ii) Monitoring of Emissions to Water of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.* *The licensee shall, within six months of date of grant of licence, present a proposal for the installation (on a long term basis) of a composite sampler to one representative discharge point within the licensed area. The proposal shall set out the rationale for selection of the nominated discharge point as well as the sampling programme. The results of this monitoring are to be reported each year as part of the AER. Any proposal to relocate the composite sampler is to be dealt with under Condition 6.3.* *A summary report of emissions to water shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.* *The licensee shall, within six months of the date of grant of licence, develop and implement a programme to ensure that all drainage water from all boglands in the licensed area is discharged via an appropriately designed silt pond treatment arrangement. The programme, to be implemented within a period to be agreed with the Agency, shall ensure that all discharges associated with operational boglands should be prioritised within this programme.*	Containment of dust, surface and groundwater emissions, traffic disruption/soiled roads, silt run off Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts dust and pollutant release to surface waters

			Within three months of the date of grant of licence, the licensee shall prepare an operational procedure for de-silting of the silt ponds. The procedure shall as a minimum provide for visual inspection of all ponds on a fortnightly basis. The de-silting roster shall be based on recommendations of such visual inspection. A log of visual inspection and de-silting shall be maintained and a summary report on the de-silting programme shall be included in the AER. The licensee shall, within twelve months of the date of grant of this licence, demonstrate to the satisfaction of the Agency that the programme of inspection is adequate. *Silt ponds serving operational bogs shall be cleaned as a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate (refer Condition 6.7).* *Within six months of the date of grant of licence, the licensee shall prepare a programme, for agreement with the Agency, to upgrade all the sedimentation pond treatment systems. The programme shall, inter alia, address provision of additional ponds, weir or pipe installation (inlet and outlet), pond configuration, use of baffles, performance efficiency and frequency of de-silting. The upgrade shall have regard to the minimum silt pond specifications detailed in Condition 6.10.* *Within three years of date of grant of this licence all existing silt ponds serving operational bogs shall achieve the following minimum performance criteria (flood periods excepted):* *• Maximum flow velocity < 10 cms-1* *• Silt design capacity of lagoons, minimum 50 m3 per nett ha of bog serviced* *All new ponds installed shall be designed to achieve these stated minimum design criteria.* *All silt ponds prone to flooding shall be de-silted by 1st November of each year. Excavated sludge shall be removed for disposal to a location outside the flood plain.* *In respect of silt control the licensee shall, within nine months of date of grant of this licence, prepare and implement procedures to ensure that:* • *drainage manholes are protected and maintained free of excessive peat,* • *headlands are kept clean and free of excessive loose peat,* • *all new manholes and outfalls are set well back from turning grounds, drivers of bog plant do not turn short (over drains) at headlands,*	

			• *harrows, millers, ridgers do not drag loose peat onto manholes or into drains, outside harrow spoons are directed away from drains,* • *silt run-off, while piping or ditching, is minimised,* • *outfalls are controlled to minimise silt discharge during cleaning operations,* • *drains are ditched in dry weather,* • *while ditching, outfalls are blocked and ditch towards outfall,* • *outlets from stockpile field drains are blocked during stockpile loading,* • *field drains adjacent to stockpiles are cleaned as soon as practicable after stockpile loading,* • *adequate room is allowed for rail bed beside Peco stockpiles,* • *all fields that have been milled are ridged at the end of the production season,* • *all fields liable to winter flooding have been cleared of milled peat or re-compacted at the end of the production season.* **Reason: To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.** **Comment** › The Applicant undertakes a comprehensive emissions monitoring programme as set out in Schedule 1 and Schedule 3 of the EPA Licence, the results of which are included in each AER. › All automatic monitors and samplers are regularly tested, serviced and calibrated. If/When the Applicant requests to use alternative monitors and samplers, prior written agreement is sought from the EPA. › Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency. Likewise, any deviations to the frequency, methods and scope of monitoring, sampling and analyses, as set out in the licence, are sought through written agreement with the EPA prior to undertaking such deviations. › Permanent, safe and clear access to waste storage areas on-site, surface water discharges and dust sampling locations for staff and Agency visitors are provided at all times.	

Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapters 4—15 Appendix 4-1: IPC Licence 501-01	Surface and ground water, Residential receptors, Employees,	**IPC Licence Condition 7 Waste Management** *Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.* *Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.* *A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:* • *The names of the agent and transporter of the waste.* • *The name of the persons responsible for the ultimate disposal/recovery of the waste.* • *The ultimate destination of the waste.* • *Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.* • *The tonnages and EWC Code for the waste materials listed in Schedule 2(i)Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.* • *Details of any rejected consignments.* *A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.* *Within nine months of the date of grant of licence, the licensee shall submit to the Agency for agreement, a proposal for identification and management of all ash and screening disposal areas. Once agreed, the proposal shall be implemented within a time-scale stipulated by the Agency.*	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air

			Reason: To provide for the disposal of waste and the protection of the environment.	
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapters 4—15 Appendix 4-1: IPC Licence 501-01	Surface and ground water, Residential receptors, Employees,	**IPC Licence Condition 8 Noise** *Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits (Leq,30min) subject to Condition 3 of this Licence:* • *Day-time: 55 dB(A)* • *Night-time: 45 dB(A)* *There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.* *Reason: To provide for the protection of the environment by control of noise.* **Comment:** Since 2000 there have been no breaches of noise limits by the onsite activities or noise complaints from noise sensitive locations in the vicinity of the site.	Containment/minimisation of health impacts by noise and vibration emissions.
Emissions Control (dust, noise, water, silt run off) **Terrestrial Habitat protection**	Chapters 4—15 Appendix 4-1: IPC Licence 501-01	Surface and ground water, Residential receptors,	**IPC Licence Condition 9 Water Protection** *Surface & Groundwater Protection-Workshop areas and Depots:* *No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.* *Monitoring and analyses of surface water discharges shall be carried out as specified in Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.*	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination

Aquatic habitat protection			*In the event that any analyses or observations made on the quality or appearance of surface water runoff should indicate that contamination has taken place, the licensee shall carry out an immediate investigation to identify and isolate the source of the contamination,* *i. put in place measures to prevent further contamination and to minimise the effects of any contamination on the environment,* *ii. and notify the Agency as soon as is practicable.* *Within twelve months of the date of grant of licence, 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, either locally or remotely, to a volume not less than the greater of the following;* *i. 110% of the capacity of the largest tank or drum within the bunded area* *ii. 25% of the total volume of substance which could be stored within the bunded area.* *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. A report on such tests shall be included in the AER.* *Within twelve months of the date of grant of licence, the loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and eachate 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, within twenty-four months of date of grant of this licence, be fitted with oil interceptors.*	

			A maintenance/cleaning log for all oil interceptors and septic tanks shall be maintained. This log shall also record the observations made during weekly inspections of all oil interceptors and bi-annual inspections of septic tanks. *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.* *The provision of a catchment system to collect any leaks from flanges and valves of all over ground pipes used to transport material other than water shall be examined.* *The licensee shall undertake a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines are tested at least every three years. A report on the first testing shall be submitted to the Agency within twelve months of the date of grant of licence and as part of the AER thereafter.* *The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.* *The licensee shall within twelve months of the date of grant of licence, arrange for* *the removal and safe disposal of waste oil and oil contaminated soil from the scrap storage area at Derrygreenagh Works.* *The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.*	

			Reason: To provide for the protection of surface waters and groundwater **Comment:** • The Applicant undertakes a programme of surface water monitoring, and the results of which were submitted to the EPA quarterly. In recent years, it has been agreed with the EPA that only occurrences of exceedances are submitted to the EPA. Should the results indicate contamination of waters, the Applicant undertakes investigations to identify the source of the contamination and controls to eliminate/minimise the impact are implemented and alerts the EPA immediately. • Within 12 months of the grant of IPC licence, all tank and drum storage areas were bunded and rendered impervious according to the requirements set out in the licence. Drainage from bunded areas is diverted for collection and appropriate disposal by a licenced operator. • Maintenance of the bunding is inspected regularly and tested every two years, the results of which are included in the corresponding AER. • All loading and unloading of fuel oils is undertaken and distillate is stored in designated areas. • All surface water discharges from workshop areas, except roof run off, is fitted with oil interceptors. • A maintenance/cleaning log for all oil interceptors and septic tanks is maintained. The log contains weekly observation notes on oil tanks and biannual inspection notes of septic tanks. • Inspections for leaks on all flanges and valves on over-ground pipes used to transport materials other than water are be carried out weekly. • The Applicant carries out a programme of testing and inspection of underground fuel pipelines every three years. The results are included in the corresponding AER. • The Applicant holds in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage. • As part of the licence agreement, the Applicant removed and safely disposed of waste oil and oil contaminated soil from the scrap storage area at Derrygreenagh Works. The removed materials were disposed of at licenced facilities.	

			The Applicant maintains a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections include records of any damage or leaks or flaws, if present, that could result in accidental spillage.	
Emissions Control (dust, noise, water, silt run off) **Terrestrial Habitat protection** **Aquatic habitat protection**	Emissions Control (dust, noise, water, silt run off) Appendix 4-1: IPC Licence 501-01	Surface and ground water, Residential receptors,	***IPC Licence compliance measures from 2000 onwards:*** ***Condition 11 Monitoring*** *The licensee shall carry out such sampling, analyses, measurements, examinations, maintenance and calibrations as set out in Schedules: -* *Schedule 1(ii) Monitoring of Emissions to Water* *Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off of this licence.* *Where the ability to measure a parameter is affected by mixing before emission, then, with prior written agreement from the Agency, the parameter may be assessed before mixing takes place.* *All automatic monitors and samplers shall be functioning at all times (except during maintenance and calibration) when the activity is being carried on unless alternative sampling or monitoring has been agreed in writing by the Agency for a limited period. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency.* *Monitoring and analysis equipment shall be operated and maintained as necessary so that monitoring accurately reflects the emission or discharge.* *The frequency, methods and scope of monitoring, sampling and analyses, as set out in this licence, may be amended with the written agreement of the Agency following evaluation of test results.* *The licensee shall clearly identify and label all emission points.*	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air

			The licensee shall install on all emission points such sampling equipment, including any data-logging or other electronic communication equipment, as may be required by the Agency. All such equipment shall be consistent with the safe operation of all sampling and monitoring systems. *The licensee shall provide safe and permanent access to the following sampling and monitoring points:* *i. Waste storage areas on-site,* *i. (ii)Surface water discharges,* *ii. (iii)Dust sampling locations,* *and safe access to any other sampling and monitoring points required by the Agency.* *Reason: To ensure compliance with the requirements of other conditions of this licence by provision of a satisfactory system of measurement and monitoring of emissions.* **Comment** The Applicant undertakes a comprehensive emissions monitoring programme as set out in Schedule 1 and Schedule 3 of the EPA Licence, the results of which are included in each AER. All automatic monitors and samplers are regularly tested, serviced and calibrated. If/When the Applicant requests to use alternative monitors and samplers, prior written agreement is sought from the EPA. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency. Likewise, any deviations to the frequency, methods and scope of monitoring, sampling and analyses, as set out in the licence, are sought through written agreement with the EPA prior to undertaking such deviations. Permanent, safe and clear access to waste storage areas on-site, surface water discharges and dust sampling locations for staff and Agency visitors are provided at all times.	

Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapters 4—15 Appendix 4-1 IPC Licence 501-01 Appendix 5-1 Fire Prevention and Fire Fighting Procedures for Peat Production Bogs Appendix 5-2: Bord na Móna Health and Safety Statement.	Surface and ground water, Residential receptors, Habitats, aquatic species Bord na Móna Employees Surface and ground water, Residential receptors, Habitats, aquatic species	**IPC Licence Condition 13 Emergency Response** *The licensee shall, within six months of date of grant of this licence, ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment.* Reason: To provide for the protection of the environment. Comment: Bord na Móna has long been a cognisant of Health and Safety. Following a number of explosions in Lullymore Briquette Factory in the late 1940s and early 1950s[3], the comprehensive scheme for accident prevention was devised[4]. In 1958, a permanent committee was established in Bord na Móna to administer accident prevention schemes. Each Works site had a first aid team consisting of trained volunteers who partook in regular training and administered first aid as required during operations. In 1981, a new safety policy was adopted across the company. Health and Safety has been an evolving field since 1988, with improvements being made to Bord na Móna's health and safety policies over the years. This has been aided by the introduction of Safety Health & Welfare at Work Act 2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013. Bord na Móna provide various training to their employees to minimise any negative impacts on health and safety on all of their sites. Bord na Móna have produced and implement an annual Health and Safety Statement which aims to: 1. *Comply, as a minimum, with all statutory requirements, common law duties, codes of practice and best industry practice relating to our activities, including the Safety Health & Welfare at Work Act*	Prevention/mitigation of environmental impacts by dust and pollutant release to air Prevention/mitigation of environmental impacts dust and pollutant release to surface waters Prevention/mitigation of impacts to human health by personal injury Prevention/mitigation of impacts to human health from dust and

[3] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 84*
[4] *Donal Clarke (2010) Brown Gold: A History of Bord na Móna and the Irish Peat Industry, pp. 102*

			2005, the SHWW (General Application) Regulations 2007, as amended, and the SHWW Construction Regulations, 2013; *Provide and maintain a safe and healthy place of work & working conditions, and to develop & maintain safe systems of work;* *Ensure adequate resources, structures and systems to effectively manage workplace safety, health and welfare;* *Identify all workplace hazards, assess the associated risks, implement appropriate control measures, taking account of the principles of prevention, to eliminate where possible or minimise such risks to acceptable levels, and monitor their effectiveness;* *Provide information, instruction and training - in a manner and language understood by the trainee - and supervision to enable employees to perform their work safely and effectively;* *Provide necessary protective equipment and safety devices and supervise their use;* *Protect, as far as is reasonably practicable, persons not employed by the company who may be affected by our activities;* *Ensure contractors and service providers comply with company safety requirements;* *Strive to continuously improve health and safety management based on performance monitoring and in line with changes in legislation and best practice;* *Build on its safety culture & continue to raise health & safety awareness amongst employees;* *Consult with employees and contractors on matters of health, safety & welfare and take account of representations made by employees on such matters; and* *Review this policy & the safety statement, as per legislative requirements, and to ensure their validity and effectiveness.*	air pollutant emissions

			Fire safety and awareness is provided as part of Bord na Móna's general safety induction with reoccurring refresher training every three years. Please see Appendix 5-1 Fire Prevention & Fire Fighting Procedures for Peat Production Bogs for further details.	
Archaeological preservation	Chapter 13 Appendix 13-1 Bord na Móna Code of Practice Appendix 13-4: 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942	Unrecorded potential subsurface Archaeology	**Archaeological Disturbance** 1. *As part of peat processing training, all bog employees must read and adhere to the recommendations 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' Department of Education 1942 (Appendix 13-4).* 2. *All bog workers must stop all works and report to the Bog Manager if archaeological finds are encountered.* 3. *If materials thought to be of archaeological interest are encountered, the Bog Manager must report the findings to the Garda Síochána within 7 days who will then contact the Commissioner of Public Works.* **2005 onwards** The 2005 Peatland surveys initiated by the National Monuments Service would have led to the discovery of any potential features within the peat. This control measure allowed for the investigation of features within the bog. **2011 onwards** The 2011 Code of Practice (Appendix 13-1) also saw the introduction of agreed principles between the National Monuments Service, the National Museum and Bord na Mona. The control measures from 2011 onwards were as follows: 1. *The Minister for Arts, Heritage and the Gaeltacht has a responsibility to protect the archaeological heritage and to exercise powers of preservation, under the National Monuments Acts 1930-2004, taking account of the European Convention on the Protection of the Archaeological Heritage (Valletta).*	Minimisation/prevention of subsurface archaeological destruction, loss or interference through drainage and extraction operations and/or failure to recognise/report finds.

			2. *The Minister's statutory responsibilities include the maintenance of the Record of Monuments and Places, with the aim of providing protection to all known archaeological monuments including those uncovered in Bord na Móna bogs.* 3. *The Director of the National Museum of Ireland has a responsibility to enforce state ownership of all archaeological objects and to safeguard the treatment of all archaeological objects before their accession into the State's repository, under National Monuments Acts 1930-2004 and the National Cultural Institutions Act 1997, taking account of the European Convention on the Protection of the Archaeological Heritage (Valletta)* 4. *Bord na Móna plc is a company with a statutory mandate, under the Turf Development Acts 1946-1998, to develop the national peat resource.* 5. *The development of peatlands has considerable archaeological implications which must be addressed given that the archaeological heritage is a non-renewable resource.* 6. *Bord na Móna has a statutory duty under the Turf Development Act 1998 (section 56) to afford appropriate protection for the environment and the archaeological heritage.* 7. *Bord na Móna will finance a balanced and cost effective approach to archaeological investigation, excavation, postexcavation and mitigation on the basis of the developer pays principle and in keeping with the Minister's stated policy in this regard.* 8. *Bord na Móna will engage a Project Archaeologist to develop archaeological strategy and to oversee the smooth running of the archaeological response to peat extraction in Bord na Móna bogs.* 9. *The adoption of a partnership approach between the Minister, the Director and Bord na Móna in pursuit of the delivery of Government policy taking account of the implications for archaeology. To this end the Archaeology Management Liaison Committee has been set up consisting of representatives of the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna, including the Project Archaeologist and Consultant Archaeologists working on Bord na Móna peatlands. The Committee will meet regularly to agree overall strategies in relation to the mitigation of peat extraction.* 10. *Appropriate strategies will be developed by the Archaeology Management Liaison Committee to minimise direct impacts on archaeology taking account of Bord na Móna's contractual obligations, annual production plans, design and safety implications, environmental and other impacts and costs.*	

			11. *All parties agree that mitigatory planning at the earliest opportunity minimises the impact on the archaeological heritage.* 12. *Bord na Móna will strive, as far as is reasonably possible, within its statutory remit, to avoid negative impacts on archaeological monuments. In cases where it is not possible to avoid impacting on monuments Bord na Móna, the Minister and the Director will cooperate to ensure, as far as possible, that appropriate archaeological mitigation is carried out in advance of peat extraction.* 13. *Prospecting for archaeological monuments, archaeological objects and other such remains, other than in circumstances approved by the Minister, in consultation with the Director, is limited to the confines of the area under peat extraction.* 14. *All parties are committed to dealing with the archaeological implications of peat extraction in a balanced and cost effective manner consistent with* i. *Observing Bord na Móna's requirement to extract peat on an extensive scale* ii. *Annual production targets in relevant bogs* iii. *A level of excavation, post-excavation and recording of archaeological monuments and archaeological objects, impacted upon by peat extraction, that is acceptable to the Minister, having consulted with the Director, and preservation in-situ of monuments in those particular circumstances where required by the Minister and which would be reasonable in practice.* 15. *Each party reserves the right to review decisions.* 16. *All parties agree that the Archaeology Management Liaison Committee will monitor the operation of this Code of Practice and carry out a formal review within three years of its adoption and at agreed intervals thereafter*	

Current Phase (June 2020 to Present Day)				
Control Measures 2000 to Present-Day (Post IPC Licence) as above and as per Section 4.7 in Chapter 4 of the rEIAR have been and are currently implemented during the Current Phase. Please refer to Sectio above for Control Measures 2000 to Present Day (Post IPC Licence)				
Decommissioning Process and Peatland Climate Action Scheme				
Discipline	**Location in rEIAR**	**Receptor**	**Control Measure**	**Impact**
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapter 4 Appendix 4-1 IPC Licence 501-01 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan	Bog habitats, aquatic habitats, mammals, bird species, surface and groundwaters Residential receptors	**Condition 10. Decommissioning** *10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:* *10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air Containment/minimisation of health

				impacts by noise and vibration emissions.
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection**	Chapter 4 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan	Bog habitats, aquatic habitats, mammals, bird species, surface and groundwaters Residential receptors	**Peatland Climate Action Scheme (PCAS)** The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures with the primary aim of optimising climate action benefits of rewetting former industrial peat extraction areas by creating soggy peatland conditions that will allow compatible peatland habitats to redevelop. These measures are separate to those defined by the IPC Licence. This scheme is in addition to the IPC licence requirements and therefore does not form part of this Substitute Consent application and is being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures e.g., bogs such as Carranstown East, Lisclogher West and Bracklin West where PCAS is currently underway. The scope of proposed rehabilitation measures, including control/mitigation measures for the three bogs that are currently active under the PCAS programme include the following, which is directly taken from Section 8 of each relevant Bog report included in Appendix 4-2 Cutaway Bog and Decommissioning and Rehabilitation Plan.	Containment of dust, surface and groundwater emissions, Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts and human health impacts by fire, dust and pollutant release to air Containment/minimisation of health impacts by noise and vibration emissions.

Remedial Phase-				
Discipline	**Location in rEIAR**	**Receptor**	**Mitigation Measure**	**Impact**
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection** **Noise and Vibration emissions**	Chapter 4 Appendix 4-1 IPC Licence 501-01 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan Bord na Móna Code of Practice	Bog habitats, aquatic habitats, mammals, bird species, surface and groundwaters Residential receptors	**Condition 10 Cutaway Bog Rehabilitation** *Cutaway Bog Rehabilitation Plan:* **10.2.1** The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence. ***10.2.2*** *The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.* ***10.3*** *The Rehabilitation Plan shall include as a minimum, the following:* ***10.3.1*** *A scope statement for the plan, to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).* ***10.3.2*** *The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.* ***10.3.3*** *A programme to achieve the stated criteria.* ***10.3.4*** *Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.* ***10.3.5*** *A programme for aftercare and maintenance.* ***10.4*** *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan.*	Environmental stabilisation raised bog restoration, and the development of active raised bog, where possible. Enhance the ecosystem services of application in particular, optimising climate action benefits.

			The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. *Reason: To make provision for the proper closure of the activity ensuring protection of the environment.*	
Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection** **Noise and Vibration emissions**	Chapter 4-15 Appendix 4-1 IPC Licence 501-01 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan Bord na Móna Code of Practice	Bog habitats, aquatic habitats, mammals, bird species, surface and groundwaters Residential receptors	Continuation of all IPC Licence compliance measures from 2000 onwards detailed above, where applicable	Environmental stabilisation raised bog restoration, and the development of active raised bog, where possible. Enhance the ecosystem services of application in particular, optimising climate action benefits.
Emissions Control (dust, noise, water, silt run off)	Chapter 4-15	Bog habitats, aquatic habitats, mammals, bird species,	The Applicant has committed to continuing compliance with conditions outlined in the IPC Licence during the Remedial Phase, where applicable. Below is a summary of the specific mitigation measures proposed for the Remedial Phase beyond that of compliance with the IPC Licence.	Containment of dust, surface and groundwater emissions,

Fire Prevention **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection** **Noise and Vibration emissions** **Traffic and Transport**	Appendix 4-1 IPC Licence 501-01 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan Bord na Móna Code of Practice	surface and groundwaters Residential receptors	**Biodiversity** › Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area as outlined in the rehabilitation plans. › Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible. See mitigation measures for Chapter 7 Land Soils and Geology and Chapter 8 Hydrology below **Land, Soils & Geology** The following environmental control measures will be implemented during the Remedial Phase in order to mitigate against leaks and spills: › All peat harvesting machinery were stored at the Ballivor Works at the end of each workday. › All machinery were regularly inspected, serviced. › All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. › A self-contained machine parts washer was located at the Workshop. › All refuelling and vehicles maintenance was undertaken at the Ballivor 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.	traffic disruption/soiled roads, silt run off Minimisation of fuel leak/groundwater contamination Prevention/minimisation of environmental impacts by dust and pollutant release to air Prevention/minimisation of environmental impacts dust and pollutant release to surface waters Prevention/minimisation of impacts to human health

			○ 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 Ballivor Works.. **Hydrology & Hydrogeology** *Surface Water Quality* The existing drainage systems and silt control measures, which have proven effect, will continue to operate during the early stages of the Cutaway Bog Decommissioning and Rehabilitation Plans when there is the potential for the entrainment of suspended solids in surface waters during drain blocking. During this time no remedial works will be completed during periods of prolonged rainfall. Silt ponds will continue to be in use and will be regularly inspected and maintained as per IPC licence requirements. All onsite activities will be completed in accordance with 'best practice' procedures. Following implementation of the rehabilitation measures a programme of aftercare and maintenance, designed in accorded to meet the Conditions of the IPC Licence, will be completed at the Application Site. This will comprise of initial quarterly monitoring, with the number of site visits reducing after 2 years to bi-annually and then after 5 years to annual visits. A water quality monitoring program will be established to monitor the impact of rehabilitation on water quality discharge from the bog. The monitoring results will be reported on each year to the EPA with the parameters to be included as	by personal injury Prevention/mini misation of impacts to human health from dust and air pollutant emissions Prevention/mini misation of environmental impacts and human health impacts by fire, dust and pollutant release to air

			follows: monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC. *Fertiliser Application* The Carranstown Bog – Cutaway Bog Decommissioning and Rehabilitation Plan (2022) includes mitigation measures for the application of fertiliser which are summarised below: › Fertiliser will not be applied on land which is waterlogged, flooded, likely to flood, frozen or covered with snow; › No fertiliser will be applied when heavy rain is forecast within the succeeding 48 hours; › No fertiliser will be applied on steeply sloping ground or where there is a rick of water pollution (i.e. the presence of drains); and, › No fertiliser will be spread on land within 2m of a surface watercourse. › Buffer zones, in accordance with EPA guidelines (www.epa.ie), will be utilised and adhered to in respect of waterbodies during fertiliser application. *Groundwater Quality* The following environmental control measures will be implemented during the remedial measures phase in order to mitigate against leaks and spills: › All machinery will be regularly checked and maintained prior to arrival at the site; › Fuelling and lubrication of equipment will only be completed in designated areas and away from surface water features; › Vehicles will never be left unattended during refuelling; › All refuelling will occur in mobile fuel bowsers; › Only dedicated, trained and competent personnel will complete refuelling operations; › Fuel bowsers will be bunded to 100% capacity to prevent any spills; › Storage tanks for bowsers and generators will be double-skinned; › Waste oils and fluids will be collected in leak proof containers and removed from the site for disposal;	

			• Spill kits will be kept on site; and, • All activities will be completed in accordance with current 'best practice' procedures. **Noise & Vibration** • The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the Application Site and immediate environs. • All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996). • The Remedial Phase activities will be restricted to daylight hours and there will be no requirement for artificial lighting. **Cultural Heritage** • Since peat activities associated with the Applicant fall under the 2012 Archaeological Code of Practice, any potential effects may be dealt with in the same way as past peat extraction activities and all ancillary works, through the implementation of mitigation measures detailed in the 2012 Code of Practice. **Material Assets** • All HGVs used on site will undergo regular inspection and maintenance checks. • All HGVs used on site will undergo wheel washing prior to crossing the local road network to access other bogs or return to the Ballivor Works for storage. • Only HGV licence holders operated the HGVs and will undergo regular re-training on HGV safety operations and vehicle maintenance. • Refuelling of all HGV vehicles was undertaken at the Ballivor Works only. • Machinery crossing points on local roads between bogs were cleaned down at the end of each working day • Car sharing by personnel and bike to work schemes will be encouraged. As part of Bord na Móna's vision for a climate neutral Ireland by 2050, the applicant encourages and promotes car sharing and cycle to work schemes where possible for its personnel	

Emissions Control (dust, noise, water, silt run off) **Fire Prevention** **Health and Safety** **Terrestrial Habitat protection** **Aquatic habitat protection** **Noise and Vibration emissions**	Chapter 4 Appendix 4-1 IPC License 501-01 Appendix 4-2: Cutaway Bog Decommissioning and Rehabilitation Plan Bord na Móna Code of Practice	Bog habitats, aquatic habitats, mammals, bird species, surface and groundwaters Residential receptors	Continuation of all IPC Licence compliance measures from 2000 onwards detailed above, where applicable	Environmental stabilisation raised bog restoration, and the development of active raised bog, where possible. Enhance the ecosystem services of application in particular, optimising climate action benefits.

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