TOBIN

BUILT ON KNOWLEDGE

Bord na Móna

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

Remedial Environmental Impact Assessment Report

Chapter 16 – Interactions

March 2025

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16.0 INTERACTIONS

16.1 INTRODUCTION

The previous Chapters 6 to 15 of this rEIAR identify and outline 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, Hydrogeology and Water Quality, Air Quality, Noise and Vibration, Landscape and Visual (LVIA), Cultural Heritage (Archaeological, Architectural and Cultural Heritage), Material Assets (including Traffic and Transport), and Climate as a result of the Project as described in Chapter 4 of this rEIAR.

This Chapter of the rEIAR presents the potential for interaction of environmental effects. 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 TOBIN, the entire project and all the work of all sub-consultants was managed and coordinated by TOBIN.

This rEIAR was edited and collated by TOBIN as an integrated report of findings from the relevant expert's impact assessments. The 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 effects have been identified during the assessment process, these effects have been avoided by design or reduced by the identified control measures and proposed mitigation, as presented throughout the rEIAR.

16.1.1 Statement of Authority

This chapter of the rEIAR has been prepared by Serena Byrne and Lauren Shinkwin and reviewed by Orla Fitzpatrick of TOBIN Consulting Engineers.

Serena Byrne is a project scientist at TOBIN Consulting Engineers, with over 12 years' multidisciplinary experience in engineering and environmental consulting, including EIA co-ordination assistance and preparation of EIAR deliverables. She holds a MSc in Environmental Sustainability from University College Dublin.

Lauren is a Project Manager in TOBIN with over 8 years' experience in ecological and environmental consulting, delivering a wide range of EIA projects including many national infrastructure projects. She holds a MSc in Wildlife Conservation, a postgraduate diploma in Project Management, and is a full member of CIEEM.

This chapter has been reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has over 20 years' experience working in the delivery of EIA projects in environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

16.2 INTERACTION OF EFFECTS

For any development with the potential for significant environmental effects there is also the potential for interaction to occur between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects, or improve them, or have a neutral effect. An interaction matrix is presented in Table 16-1 below. This identifies potential interactions between the various environment aspects assessed in this rEIAR. The matrix highlights the occurrence of potential interaction (either positive or negative effects) during the Peat Extraction Phase, Current Phase, and Remedial Phase. The matrix is symmetric, with each environmental aspect addressed in Chapters 6 to 15 of this rEIAR placed on both axes of the matrix.

Table 16-1 Interaction Matrix: Potential for Interaction of Effects

Key: X - Potential for Interacting Effect; O - No Potential for Interacting Effect										
	Population & Human Health	Biodiversity	Land, Soils & Geology	Hydrology, Hydrogeology & Water Quality	Air Quality	Noise & Vibration	Landscape & Visual	Archaeology & Cultural Heritage	Material Assets (inc. Traffic & Transport)	Climate
Population & Human Health		O	X	X	X	X	X	X	X	X
Biodiversity	O		X	X	X	X	X	O	O	X
Land, Soils & Geology	X	X		X	X	O	X	X	O	X
Hydrology, Hydrogeology & Water Quality	X	X	X		O	O	O	O	O	O
Air Quality	X	X	X	O		O	O	O	O	O
Noise & Vibration	X	X	O	O	O		O	O	O	O

Key: X - Potential for Interacting Effect; O - No Potential for Interacting Effect										
	Population & Human Health	Biodiversity	Land, Soils & Geology	Hydrology, Hydrogeology & Water Quality	Air Quality	Noise & Vibration	Landscape & Visual	Archaeology & Cultural Heritage	Material Assets (inc. Traffic & Transport)	Climate
Landscape & Visual	X	X	X	O	O	O		O	O	O
Archaeology & Cultural Heritage	O	O	X	O	O	O	O		O	O
Material Assets (inc. Traffic & Transport)	X	O	O	O	O	O	O	O		O
Climate	X	X	X	O	O	O	O	O	O	

16.2.1 Population and Human Health

16.2.1.1 Population and Human Health and Noise and Vibration

Peat Extraction Phase (1988 – July 2019)

Excessive noise levels can result in deficiencies in hearing and sleeping patterns. It can also contribute to hypertension, heart disease, and annoyance. All these effects can contribute to the decline of an individual's personal health and well-being. However, the noise impact assessment did not identify significant noise and vibration levels during the Peat Extraction Phase on nearby sensitive receptors given the distances between peat extraction actvities and nearby noise sensitive properties. The assessment concluded that noise emissions and vibration generated during the Peat Extraction Phase were 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.

Significant negative effects on the health of sensitive receptors in the local population during the Peat Extraction Phase are unlikely due to their distance from the peat extraction areas and the seasonal nature of the activity. As such, it is considered that activities during the Peat Extraction Phase would have resulted in not significant, negative, long-term effects on human health.

Current Phase (July 2019 - Present Day)

Peat extraction ceased in July 2019. Since then, activities at the Application Site continue to operate under the requirements of IPC Licence P0504-01. Due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, noise generating movements are at a much lesser volume than during the Peat Extraction Phase. Noise emissions are during this phase are typically generated by onsite machinery, staff vehicles and small and infrequent truck movements. The onsite machinery and vehicles include; Wheeled Loader Lorry, Track Excavator, Locomotive and Wagons, Dump Truck, and Tractors. The Application Site has been in full compliance with the noise limits set out in the IPC Licence during the Current Phase.

The noise emissions associated with the current onsite activities are considered less than the noise emissions associated with the Peat Extraction Phase. The Noise and Vibration assessment concludes that the residual effects at the nearest noise-sensitive locations associated with the current phase are negative, but not significant.

Therefore, it is considered a negative, imperceptible, short-term, not significant 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.

The noise emissions associated with the future rehabilitation works in the Remedial Phase are considered less than those associated with the Peat Extraction Phase. The Noise and Vibration assessment concludes that the potential of residual effects associated with the Remedial Phase are considered negative, but not significant.

Therefore, a negative, long-term, not significant effect on population and human health is predicted during the Remedial Phase.

Please see Chapter 11: Noise and Vibration and Appendix 4-3 Cutaway Bog Decommissioning and Rehabilitation Plans for further details.

16.2.1.2 Population and Human Health and Air Quality and Climate

Peat Extraction Phase (1988 – July 2019)

Peat extraction activities and ancillary works would have generated dust effects within the vicinity of the Application Site, as identified in Chapter 9 (Air Quality) of this rEIAR. Historic peat extraction activities would have generated dust effects at nearby properties. The milling, harrowing, ridging and harvesting processes would have generated some dust emissions. Emissions from vehicles during the Peat Extraction Phase would have also affected air quality. The Air Quality assessment concluded that the worst-case effect from traffic emissions associated with peat extraction activities was direct, negative, long-term and imperceptible.

The peat extraction activities would have led to some dust emissions with the potential to cause soiling and human health effects at nearby sensitive receptors. It has been established that the peat extraction works had a medium risk of dust soiling effects, a low risk of dust-related human health effects and a high risk of dust soiling effects on vegetation within a section of the Lough Bawn and Royal Canal pNHAs. 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. Dust monitoring results available for the period 2002 - 2019 indicate there were very few exceedances of the emission limit value of 350 mg/m^2/day at the representative monitoring locations at the Mountdillon Bog Group. There have been some historic dust complaint issues from nearby sensitive properties in the area indicating that at times there have been dust issues from site activities. The Air Quality assessment concluded that the activities on site had a long-term, localised, direct, negative and slight effect on air quality.

Therefore, it is considered that activities during the Peat Extraction Phase would have resulted in not significant, slight, negative, long-term effects on population and human health due to effects on air quality.

Please see Chapter 9 (Air Quality) for further details.

It is estimated that there was on average 274,149 tonnes of CO_2 per annum released from the Application Site over the 31-year period between July 1988 and 2019. Please see Appendix 15-1 (Carbon Calculations) for more details on how this figure was derived. See Chapter 15 (Climate) for further details and the assessment of climate effects resulting from Bord na Móna's historic peat extraction activities and ancillary activities at the Application Site.

The release of CO_2 from the peat extraction activities and ancillary activities during the Peat Extraction Phase resulted in a direct, long-term, negative, significant residual effect on population and human health due to climate.

Please see Chapter 15 (Climate) for further details.

Current Phase (July 2019 - Present Day)

Peat extraction ceased in July 2019 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. 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 effect on air quality.

There are no carbon losses associated with peat removal on-site during the Current Phase as peat extraction has ceased. The effect on climate is short-term, imperceptible and neutral.

Therefore, a short-term, imperceptible, neutral residual effect on population and human health due to air quality and climate has occurred during the Current Phase.

Please see Chapter 9 (Air Quality) and Chapter 15 (Climate) for further details.

Remedial Phase

There are minimal works involved in the Remedial Phase that have the potential to effect air quality. The primary activities will involve re-vegetation of the site, drain blocking, re-wetting of the bogs where possible. Monitoring of the site will be undertaken to ensure stabilisation of the site and complete re-vegetation.

Air quality effects from dust emissions during the Remedial Phase will be direct, long-term, localised, negative, and imperceptible. Effects from vehicle emissions will be neutral and imperceptible due to the low number of vehicles required for the works.

In terms of climate, 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. With the restoration of the carbon sink potential of the land, the Application Site will aid in Ireland's trajectory towards net zero by 2050. The effect on climate is considered long-term, neutral and not significant.

Therefore, there will be a long-term, neutral and not significant 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.

16.2.1.3 Population and Human Health and Land, Soils and Geology

Peat Extraction Phase (1988 – July 2019)

Peat extraction activities by their very nature impact on peat and subsoils. A significant change to the land/soil environment will have occurred during the Peat Extraction Phase. The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development, including accidental spillage, pollution and contamination. No evidence of contamination was identified on site. Proven and effective measures to mitigate the risk of spills and leaks were implemented by Bord na Móna at the Application Site during the Peat Extraction Phase. 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.

The potential for contamination of soils is considered to have had a long-term, imperceptible negative effect on population and human health during the Peat Extraction Phase.

Current Phase (July 2019 - Present Day)

The Current Phase has involved peat stockpiles and loose peat on the active peat extraction areas being removed and the area allowed to re-vegetate and benefit from natural re-colonisation. There were no records of peat instability recorded within the Application Site. No intrusive works are being carried out and the management of fuel/chemicals/hydrocarbons on site is in accordance with the IPC Licence. Therefore, the potential for soil contamination and peat instability are considered unlikely.

Therefore, 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. The management of fuels/chemicals/hydrocarbons and on site will be in accordance with the IPC Licence. Therefore the potential for soil contamination and peat instability are considered unlikely.

Therefore, a short-term, imperceptible and negative effect on population and human health due to land, soils and geology is associated with the Remedial Phase.

Please see Chapter 7 (Land, Soil and Geology) for further details.

16.2.1.4 Population and Human Health and Water

Peat Extraction Phase (1988 – July 2019)

During the Peat Extraction Phase there would have been potential for pollutant pathways from the Application Site to receiving waterbodies from the storage of fuel and other pollutants. This would have had the potential to affect local water quality and possibly local water supplies. However measures were in place during the Peat Extraction Phase to prevent release of pollutants and silt from the Application Site and therefore reduce the potential for effects on human health from water sources. Drainage channels and silt ponds were in place by 1988. Activities at the the Application Site have been regulated by IPC Licence (Reg. No. P0504-01) since 2000.

Due to the nature of the peat extraction process, combined with the control measures and environmental monitoring implemented at the site, water related effects on population and human health resulting from the Peat Extraction Phase are considered unlikely.

Please see Chapter 8 Hydrology and Hydrogeology for further details.

Current Phase (July 2019 - Present Day)

During the Current Phase some limited activity at the Application Site is required to comply with IPC Licence requirements. This involves the use of machinery and plant with which there is a risk of accidental spillage of hydrocarbons. The Mountdillon Works have 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 during the Peat Extraction Phase, albeit to a lesser extent due to lower site activity and lower volumes of plant, machinery and workers operating at the site during this phase.

However, due to the cessation of peat extraction, combined with the control measures and environmental monitoring implemented at the Application Site, water related effects on population and human health resulting from the Current Phase are considered unlikely.

Please see Chapter 8 (Hydrology, Hydrogeology and Water Quality) for further details.

Remedial Phase

Following the implementation of the PCAS and proposed Decommissioning and Rehabilitation Plans (Appendix 4-3), the bogs will become wetter, retain more water, and gradually recolonise with vegetation. Over time, they will develop into a peatland / wetland mosaic with reduced silt and nutrient outputs.

Therefore, 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, Hydrogeology and Water Quality) for further details.

16.2.1.5 Population and Human Health and Material Assets (including Traffic and Transport)

Peat Extraction Phase (1988 – 2019)

Peat extraction activities and 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 and rail transporting peat had the potential to emit dust and soil roads, effect traffic flow, cause traffic disruption / delays, or 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 is considered to have had a long-term, imperceptible, negative residual effect on population and human health in terms of traffic and transport between 1988 and July 2019.

Between 1988 and July 2019, waste management at the facility became more regulated with the introduction of IPC Licence P0504-01 in 2000, requiring an Environmental Management System (EMS) and specific waste handling procedures. Hazardous and non-hazardous waste were managed under the licence, with improved bunding, oil interceptors, and refuelling procedures. Peat extraction ceased in July 2019, leading to a reduction in both hazardous and non-hazardous waste volumes. Compliance with waste regulations, including The Waste Management Act 1996 (as amended), ensured proper waste disposal and reporting through the AER. The Peat Extraction Phase had a long-term, imperceptible to slight, negative residual effect on population and human health due to waste management.

Please see Chapter 14 Material Assets for further details.

Current Phase (2019 - Present Day)

Due to the cessation of peat extraction, traffic volumes generated by the Current Phase are significantly lower than during the Peat Extraction Phase. Control measures undertaken during this phase are the same as those undertaken in the Peat Extraction Phase. In addition, 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. Therefore, there potential to reduce the daily LGV numbers travelling to and from at the Application Site even further. The traffic generated to and from the Application Site during the ongoing decommissioning phase (including peat stockpile transport) is considered to be a negative, short

term, imperceptible effect on population and human health in terms traffic volumes, roads and road users.

Decommissioning activities are underway in accordance with Condition 10 of the IPC Licence, which mandates the removal, disposal, or recovery of any materials, equipment, or substances that could result in environmental pollution. This includes decommissioning buildings, equipment, waste, remaining peat stockpiles, and rail tracks, with specific actions detailed in the decommissioning plan. Waste management follows Condition 7 of the IPC Licence, ensuring waste is disposed of or recovered by licensed contractors and records are maintained. Bord na Móna aims to reuse or recycle waste where possible. Therefore, the Current Phase has had a short-term, slight, negative, residual effect on population and human health due to waste management.

Please see Chapter 14 Material Assets for further details.

Remedial Phase

Activity during the Remedial Phase will have a short to long-term, imperceptible, negative effect on population and human health in terms of traffic volumes, roads and road users.

During the Remedial Phase, waste generated will primarily be from generated by environmental monitoring staff (e.g., food, paper etc.) which will be removed off site by each staff 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.

16.2.1.6 Population and Human Health and Landscape and Visual

Peat Extraction Phase (1988 – July 2019)

In terms of landscape effects, there was a broad-scale and comprehensive physical landscape impact on the bog itself from the extraction operations. In combination with the extraction activities and associated transport infrastructure, this would have contributed to an industrialisation of the previously naturalistic bog landscape, but most of this had already occurred prior to 1988. For this reason, the effects on landscape due to the Peat Extraction Phase from 1988 to cessation in July 2019 are considered to be of a Medium magnitude. When combined with the Low landscape sensitivity judgement (see section 12.4.2 of Chapter 12 (LVIA)), the overall significance of effect is deemed to be Moderate-slight.

In terms of visual effects, by 1988 a considerable portion of the bog had been cutaway or drained and subject to peat extraction, with peat extraction having been underway across the Application Site since 1952. Visual effect would have related to movement of workers and machinery, transport and transport infrastructure, as well as accommodation and welfare facilities. Dust plumes are also likely to have been associated with peat extraction areas. From most receptor locations in the surrounding area including roads, settlements and residences within approximately 1-2 km of the Application Site, it is likely that the full extent of the Application Site was not visible as there are relatively few open views across the bogs from the public realm, even from relatively short distances away due to intervening vegetation screening. Therefore, effects would have been more localised to the nearest fringes of the bog. Nonetheless, from some locations, such as sections of the N63, R398 and the R392 roads, there would have been notable visual effect, or some visibility of peat extraction activities. However, given this busy baseline scenario and the fact that industrial-scale peat extraction activities

were a long-established feature of predominantly the summer months, it is not likely that significant visual effects occurred between 1988 and the cessation of peat extraction in 2019.

The magnitude of visual effects is not considered to have been greater than Low. When combined with the Low visual receptor sensitivity judgement (see section 12.4.2 of Chapter 12 (LVIA)), the overall significance of effect is deemed to be Slight.

Please see Chapter 12 (LVIA) for details.

Current Phase (July 2019 - Present Day)

Decommissioning at the Application Site commenced following the cessation of peat extraction in 2019 in accordance with the Cutaway Bog Decommissioning and Rehabilitation Plans (see Appendix 4.3 of the rEIAR) put in place in accordance with IPC Licence requirements.

In landscape and visual terms, activity associated with the Current Phase of the site, which includes/included removal of unutilised buildings or features, cleaning silt ponds and removal of peat stockpiles, results in low magnitude effects on the physical landscape and land cover and will facilitate regeneration through Remedial Phase measures once complete. Similarly, it has a low magnitude effect on visual amenity, especially as many of the features being removed and recovered are at a considerable remove from the public realm.

Whilst ongoing, the activities in the Current Phase are considered to generate a low magnitude of landscape effect and a low magnitude of visual effect, which is marginally negative. When combined with the low landscape sensitivity judgement (see section 12.4.2 of Chapter 12 (LVIA)), the overall significance of the Current Phase on landscape effect and visual effect is deemed to be Slight / Neutral-Negative.

However, once fully complete, works associated with the Current Phase will have a positive landscape and visual effect on the sites as there will be less evidence of human influence than during the baseline operational years (1988-2019).

Please see Chapter 12 (LVIA) for details.

Remedial Phase

Bord na Móna are required under Condition 10.2 of the IPC Licence to prepare and implement, Cutaway Bog Decommissioning and Rehabilitation Plans. Bord na Móna have produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for each of the three bogs within the Application Site (i.e., Derryaroge Bog, Derryadd Bog, and Lough Bannow Bog). There is a Final Cutaway Bog Decommissioning and Rehabilitation Plan for parts of Derryaroge Bog (see Appendix 4.3).

The types of measures that have most relevance to the landscape and visual setting mainly relate to the rewetting of bogs through the likes of drain blocking and construction of berms and reprofiling of fields. The Remedial Phase also includes grassland establishment, and the establishment of Birch dominated scrub. These are subtle physical interventions in the context of the baseline scenario of cutaway peatlands and will result in positive outcomes for biodiversity and a more naturalistic wetland appearance for the Application Site. Such effects are considered to be of a Low magnitude and a Positive quality relating in a Slight / Positive significance.

Please see Chapter 12 (LVIA) for details.

16.2.2 Biodiversity

16.2.2.1 Biodiversity and Land, Soils and Geology

Peat Extraction Phase (1988 – July 2019)

By 1988, the Application Site had already undergone extensive land stripping due to peat extraction and related activities, significantly altering its soil composition. Much of the area was characterised by cutover bog and exposed peat, with only small patches of intact raised bog remaining. From 1988 peat extraction activity continued at the Application Site until July 2019 hindering natural habitat recovery. However, as peat extraction activity gradually declined from its peak in 1988, some abandoned or less intensively worked sections may have begun to recover, showing early signs of recolonisation and limited habitat rehabilitation.

Bord na Móna implemented standard operating procedures and best practices to manage environmental risks from peat extraction, particularly regarding suspended solids and contamination, effectively protecting water quality in surrounding areas. In 2000, the EPA issued an Integrated Pollution Control (IPC) Licence (P0504-01), amended in 2012, to regulate peat extraction activities at the Mountdillon Bog Group, which includes Derryaroge, Derryadd, and Lough Bannow bogs. The IPC licence focuses on controlling and monitoring water emissions, addressing risks such as increased suspended solids due to soil disturbance, drainage, and sediment runoff, which can occur as peat surfaces are exposed and prone to erosion, particularly during heavy rainfall. s. With the implementation implementation of standard operating procedures and IPC Licence control measures effects during the Peat Extraction Phase resulted in long-term, moderate negative impact on habitats and associated fauna. The widespread presence of bare peat and cutover bog created unsuitable conditions for many bird, mammal, reptile, and amphibian species that rely on more complex or mature habitats for shelter, feeding, or breeding. While relatively undisturbed raised bog areas provided some valuable habitat, the site as a whole was unlikely to support significant faunal populations beyond a local scale. Given the already degraded state of the site in 1988 and the lack of mitigation measures, the impacts on fauna during this Phase are considered to have been long-term, moderate, and negative.

Please see Chapter 7 (Biodiversity) for details.

Current Phase (July 2019 - Present Day)

Since the cessation of peat extraction in 2019, activities at the Application Site have focused on decommissioning and rehabilitation activities that have not resulted in further loss or degradation of habitats. Access for machinery for decommissioning and peat stockpile removal has been carried been restricted to areas previously affected by peat extraction, preventing disturbance to undisturbed habitat. As a result, some recovery has occurred, evident in transitional habitats, however, adopting a precautionary approach, the impacts on habitats and associated fauna are assessed as long-term, moderate, negative due to the likely persistent legacy of extraction activities.

Please see Chapter 7 (Biodiversity) for details.

Remedial Phase (Future)

The Rehabilitation Plans for the Application Site aim to rehabilitate and enhance the ecological integrity of the peatland through active rehabilitation measures and natural colonisation. Careful planning, including restricted machinery use, designated activity zones, and ongoing

environmental monitoring, will prevent habitat loss or degradation during the Remedial Phase. As outlined in the Biodiversity Chapter, these best practice measures will support peatland restoration, soil recovery, and long-term biodiversity enhancement, resulting in a permanent, significant, positive effect on habitats within the Application Site.

The expansion of habitats such as heath, scrub, and woodland, which have developed since peat extraction ceased, will provide increased cover and nesting opportunities for bird species, while also supporting local populations of foraging and commuting mammals, including bats, small mammals, and badgers. Although minor and temporary disturbances to fauna may occur, no significant long-term negative effects are anticipated. Instead, the rehabilitation measures are expected to have a long-term, moderate, positive impact on fauna by enhancing habitat availability and ecological connectivity.

During the Remedial Phase measures set in place will bring about stabilisation of the soils and habitats at the Application reducing vulnerability to erosion. This will improve conditions including water quality at the site and the quality of water flowing from the Application Site to the pNHAs and European sites.

Please see Chapter 7 (Biodiversity) for details.

16.2.2.2 Biodiversity and Water

Peat Extraction Phase (1988 – July 2019)

As outlined in the Biodiversity Chapter, while adverse effects on water and connected habitats had occurred by 1988, best practice control measures implemented by Bord na Móna helped mitigate impacts on water quality during peat extraction. These efforts were further reinforced by measures introduced following the issuance of the IPC Licence in 2000. Collectively, these measures not only protected water quality but also indirectly benefited surrounding habitats. However, despite these controls, peat extraction from 1988 onwards likely resulted in long-term, moderate negative effects on aquatic habitats.

Water quality at the Application Site during this Phase also had indirect effects on terrestrial species, such as Otters and wetland birds, which rely on aquatic ecosystems for food and shelter. These impacts are considered to have been long-term, significant, and negative. Nevertheless, the implementation of best practices by Bord na Móna, alongside measures required under the IPC Licence, helped reduce the extent of these effects on both habitats and the species dependent on them.

During the Peat Extraction Phase, pNHAs were listed on a non-statutory basis in 1995, while two European sites relevant to the Project were designated in 1995 and 1996. Several pNHAs, and the two European sites have hydrological linkages to the Project. With the implementation of Bord na Móna's best practice control measures and the requirements of the IPC Licence, activities during this Phase would have ensured that hydrological effects on the sites were not significant. During this Phase of the Project, activities may have resulted in disturbance to mobile species from designated sites using the Application Site.

Current Phase (July 2019 - Present Day)

Since the cessation of peat extraction in July 2019, potential impacts on water quality have significantly decreased, including reduced risks of suspended sediment release and pollution events affecting watercourses and groundwater. Protection measures in place help manage water quality, ensuring that adverse effects on aquatic species remain low. However, legacy

effects of extraction activity on water quality may persist. Adopting a precautionary approach, the impacts on aquatic fauna and habitats during this Phase are considered to have long-term, moderate, negative effects.

For terrestrial fauna, the primary concern during the Current Phase is the potential degradation of aquatic habitats that support species such as Otters and wetland birds, particularly in areas within and downstream of the Application Site. However, due to the water quality protection measures in place, the risks during this Phase are significantly lower than in previous Phases. As a result, the impacts on terrestrial fauna are assessed as long-term, slight, negative effects.

While several pNHAs and European sites are hydrologically connected to the Project, activities during this Phase are unlikely to have resulted to significant negative effects to the pNHAs and European sites. The cessation of peat extraction activity in 2019 have resulted in a significant decrease in the potential for disturbance to species from European Sites using the Application Site. As a result, no interactions are anticipated.

Remedial Phase

The implementation of the proposed rehabilitation plans will enhance hydrological conditions, leading to long-term habitat improvement within the Application Site. This is expected to result in a permanent, significant, positive effect on existing habitats and associated fauna.

During the Remedial Phase, operations will be subject to required control measures, which, over time, have the potential to yield a long-term, moderate, positive effect on water quality. As the restored peatlands become self-regulating, nutrient and sediment runoff to the surrounding watercourses will be significantly reduced.

Improvement in water quality at the site will, in turn, support the recovery of local habitats and aquatic fauna, enhancing the overall environmental condition of the site, and the quality of water flowing from the Application Site to designated sites. Consequently, no negative effects to the pNHAs and European sites will occur.

Please see Chapter 7 (Biodiversity) for details.

16.2.2.3 Biodiversity and Noise and Vibration

Peat Extraction Phase (1988 – July 2019)

Peat extraction and ancillary activities would have had resulted in disturbance to local bird populations utilising the site during this Phase. Noise from machinery, railway tracks, and human activity on site would have resulted in disturbance to species that may have been using the Application Site and nearby surrounding areas. The overall impact is considered to have had a long-term, moderate, negative effect on fauna.

The non-statutory listing of pNHAs and the statutory designation of European sites occurred prior to the Peat Extraction Phase, consequently, effects for this Phase are not assessed.

Current Phase (July 2019 - Present Day)

Effects on Fauna

Due to the lower volume of plant, machinery, and workers operating on site, the impact on fauna species as a result of disturbance and displacement are considered to be of a smaller magnitude than during the Peat Extraction Phase. Overall, the impacts on fauna during the Current Phase

are assessed as having a long-term, slight, negative effect at the Application Site but also to mobile fauna from European sites that may be using the area.

Remedial Phase

Effects on Fauna

The proposed rehabilitation activities are expected to result in minimal potential disturbance to fauna species as the works and will involve only a short-term presence of machinery and personnel which will be much lower in volume compared to the past peat extraction activities. Whilst there may be some temporary disturbance to local fauna, and mobile fauna from European sites that may be using the Application Site, the overall outcome of the proposed rehabilitation plan has the potential to have long-term, moderate, positive effects on fauna (as described in more detail in the Biodiversity Chapter).

Please see Chapter 7 (Biodiversity) for details.

16.2.3 Land, Soils and Geology

16.2.3.1 Land, Soils and Geology and Water Quality

Peat Extraction Phase (1988 – July 2019)

Due to the fact that drainage of the peatland occurred commenced in 1949 and peat extraction had commenced across all areas by 1964, the main effects of draining the Application Site occurred 25-40 years prior to 1988.

The effects of drainage may have accelerated peat decomposition and reduced dissolved and particulate organic carbon retention within the peat. Peat extraction activities can result in an increase in sediment and nutrients runoff and therefore effect on the quality of the receiving waters in the catchments draining the area. Water quality was 'moderate' over an extended period between 1988s and the present day. The Application Site has been moderate in terms of water quality since regular monitoring commenced. The waters of the catchment area are also of moderate quality. There has not been any significant deterioration or changes in water quality since 1988 and that the overall water quality of the region is moderate Therefore, as there have not been any broad changes in water quality over the course of the EPA monitoring timeframe and that the overall water quality of the region is moderate, it is concluded that peat extraction activities did not have a significant effect on the overall water quality in the area.

Please see Chapter 7 (Land, Soil and Geology) and Chapter 9 (Hydrology, Hydrogeology and Water Quality) for further details.

Current Phase (July 2019 - Present Day)

Decommissioning of the peat extraction activities associated with the IPC Licence are currently underway across the Application Site. During the Current Phase some limited activity at the Application Site is required to comply with the IPC Licence requirements. This involves the use of machinery and plant with which there is a risk of accidental spillage of hydrocarbons. The Mountdillon Works remains 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 in the Peat Extraction Phase, albeit to a lesser extent due to lower site activity and lower volumes of plant, machinery and workers operating at the site during the Current Phase.

In terms of water quality, monitoring data show that downstream water quality is not significantly altered since the cessation of peat extraction. This is potentially due to other activities in the catchment (agriculture on peat/poorly drained soils, forestry and wastewater) affecting water quality and remained largely unchanged during the Peat Extraction Phase. The effect on downstream surface water quantity is unlikely to be significant, as drainage systems were designed to limit runoff to greenfield rates.

Please see Chapter 7 (Land, Soil and Geology) and Chapter 9 (Hydrology, Hydrogeology and Water Quality) for further details.

Remedial Phase

As mentioned, monitoring data show that downstream water quality is not significantly altered since the cessation of peat extraction. The effect on downstream surface water quantity is unlikely to be significant, as drainage systems were designed to limit runoff to greenfield rates.

Following the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans, the bogs will become wetter, retain more water, and gradually recolonise with vegetation. Over time, they will develop into a peatland / wetland mosaic with reduced silt and nutrient outputs.

As a result, the residual effects of these plans are expected to have a moderate, positive, indirect, and long-term effect on downstream surface water hydrology and water quality.

Please see Chapter 7 (Land, Soil and Geology) and Chapter 9 (Hydrology, Hydrogeology and Water Quality) for further details.

16.2.3.2 Land, Soils and Geology and Archaeology and Cultural Heritage

Peat Extraction Phase (1988 – July 2019)

It is possible that significant negative effects could have taken place to sub-surface finds and features. This negative effect would have been mitigated by Peatland Surveys from 1988 onwards as well as the introduction of the 2012 Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna. Over the course of the Peat Extraction Phase a total of four hundred and forty-eight SMRs and numerous archaeological artefacts have been recorded in the Application Site. In this regard it is considered that that residual effects on sub-surface finds and features from 1988 to 2019 were Slight to Moderate.

Peat extraction activities and all ancillary activities could have resulted in a significant, direct negative effect on the cultural heritage. However with the mitigation measures implemented the works have had a direct positive effect on the cultural heritage. There has been an increase in the level and understanding of the archaeological and historical landscape as a result of archaeological assessments, subsequent excavations and preservation works. The various acts (National Monuments Acts, Turf Development Acts 1946 - 1998 (section 56) and the 2012 Code of Practice) have afforded appropriate protection for the environment and archaeological heritage.

Please see Chapter 13 (Cultural Heritage) for further details.

Current Phase (July 2019 - Present Day)

Since the cessation of activity in 2019, it is considered that no direct effects would have occurred during the Current Phase. No direct effects as a result of Current Phase activityare

identified. Therefore, as no effects were identified without the need for control measures, no residual effects will occur.

The overall significance of effects on subsurface archaeology, if present, as a result of the Current Phase is considered to be Slight-Moderate.

Please see Chapter 13 (Cultural Heritage) for further details.

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.

The overall significance of effects on subsurface archaeology, if present, as a result of the Remedial Phase is considered to be Slight-Moderate.

Please see Chapter 13 (Cultural Heritage) for further details.

16.2.3.3 Land, Soils and Geology and Landscape and Visual

Peat Extraction Phase (1988 – July 2019)

As discussed above in Section 16.2.1.7.

The landscape effects of the extraction phase from 1988 to the cessation of peat extraction in 2019 are considered to be of a Medium magnitude. When combined with the Low landscape sensitivity judgement (see section 12.4.2 of Chapter 12 (LVIA)), the overall significance of effect is deemed to be Moderate-slight.

The magnitude of visual effects is not considered to have been greater than Low. When combined with the Low visual receptor sensitivity judgement (see section 12.4.2 of Chapter 12 (LVIA)), the overall significance of effect is deemed to be Slight.

Please see Chapter 12 (LVIA) for full details.

Current Phase (July 2019 - Present Day)

As discussed above in Section 16.2.1.7.

Whilst ongoing, the activities in the Current Phase are considered to generate a low magnitude of landscape effect and a low magnitude of visual effect, which is marginally negative.

Please see Chapter 12 (LVIA) for full details.

Remedial Phase

As discussed above in Section 16.2.1.7.

Bord na Móna are required under Condition 10.2 of the IPC Licence to prepare and implement, a Cutaway Bog Decommissioning and Rehabilitation Plan. Bord na Móna have produced a Cutaway Bog Decommissioning and Rehabilitation Plan for each of the three bogs within the Application Site (i.e., Derryaroge Bog, Derryadd Bog, and Lough Bannow Bog)(see Appendix 4.3).

Measures include rewetting of bogs, grassland and birch dominated scrub establishment, leading to positive outcome for the land, soils and geology environment considered of low magnitude and slight positive significance.

Please see Chapter 12 (LVIA) for full details.

16.2.3.4 Land, Soils and Geology and Air Quality and Climate

Peat Extraction Phase (1988 – July 2019)

Historic peat extraction activities would have generated dust effects at nearby properties. Activity on the bogs within the Application Site, including milling, harrowing, ridging and harvesting processes, would have generated some dust emissions. It has been established that the peat extraction works had a medium risk of dust soiling effects and a high risk of dust soiling effects on vegetation within a section of the Lough Bawn and Royal Canal pNHAs. However, it is noted that the stockpiled peat was covered once extracted in order to minimise milled peat being dispersed by the wind, as well as to keep the peat dry until required for use, and as such the covering of the peat would have greatly reduced the potential for dust emissions from stockpiled peat. As part of the IPC licence (since 2000) 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. dust monitoring results available for the period 2002 - 2019 indicated there were very few exceedances of the emission limit value of 350 mg/m^2/day at the representative monitoring locations at the Mountdillon Bog Group site. There have been some historic dust complaint issues from nearby sensitive properties in the area indicating that at times there have been dust issues from site activities.

It can be concluded that the activities on Application Site had a long-term, localised, direct, negative and slight effect on air quality.

Please see Chapter 10 (Air Quality) for further details.

As mentioned in Section 16.2.1.2 above, it is estimated that there was on average 274,149 tonnes of CO_2 per annum released from the Application Site over the 31-year period between July 1988 and 2019. The release of CO_2 from the peat extraction activities and all ancillary works activities during the Peat Extraction Phase resulted in a direct, long-term, negative, significant residual effect population and human health due to climate.

Please see Appendix 15-1 (Carbon Calculations) and Chapter 15 (Climate) for further details and the assessment of climate effects resulting from Bord na Móna's historic peat extraction activities and ancillary activities at the Application Site.

Current Phase (July 2019 - Present Day)

Peat extraction ceased in July 2019. 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.

There are no carbon losses associated with peat removal on-site during the Current Phase as peat extraction has ceased. The effect on climate is short-term, imperceptible and neutral.

Please see Chapter 9 (Air Quality) and Chapter 15 (Climate) for further details.

Remedial Phase

There are minimal works involved in the Remedial Phase that have the potential to effect air quality. The primary activities will involve re-vegetation of the site, drain blocking, re-wetting of the bogs where possible. Monitoring of the site will be undertaken to ensure stabilisation of the site and complete re-vegetation. Air quality effects from dust emissions during the Remedial Phase are predicted to be direct, long-term, localised, negative, and imperceptible.

In terms of climate, 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. 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 effect on climate is considered long-term, neutral and not significant.

Please see Chapter 9 Air Quality and Chapter 10 Climate for further details.

16.2.4 Vulnerability to Natural Disasters

During the Peat Extraction and Current Phases of the project from 1988 to the present day, there have been no major accidents and/or natural disasters recorded.

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 which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment. As the IPC licence is still active, this procedure is still in place.

Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health, for example bulk storage of hydrocarbons, chemicals, wastes, etc., are subject to the conditions of the IPC licence.

Historically, there has been limited potential for significant natural disasters to occur within the project. The potential natural disasters that may occur on peatlands are limited to flooding, fire, or landslides.

Flood risk has been considered in Chapter 9 (Hydrology, Hydrogeology and Water Quality). The risk of landslides has been assessed in Chapter 8 (Land, Soils and Geology).

The 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 is no potential effects from this source[1].

[1] https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/

16.3 RESIDUAL EFFECTS

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 6 – 15) of the EIAR and are detailed in Chapter 17 (Schedule of Mitigation) 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 effects and the significant of effects, is also presented in each relevant chapter.

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