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LONGFORDPASS, LITTLETON, LANESPARK AND DERRYVELLA BOGS – APPLICATION FOR SUBSTITUTE CONSENT

Remedial Environmental Impact Assessment Report

Chapter 10 - Noise and Vibration

Prepared for:

Bord na Móna Energy Ltd

BnM

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10. NOISE AND VIBRATION

10.1 Introduction

This chapter assesses potential significant effects from noise and vibration associated with Bord na Móna Energy Ltd's (hereafter referred to as Bord na Móna) historic peat extraction and associated activities at the Application Site. As described in Chapter 4 - Description of the Development, Volume 2, peat extraction ceased in 2017 and therefore three phases are considered: the Peat Extraction Phase (1988–2017), the Current Phase (2017 to present) comprising decommissioning works and Rehabilitation Phase 1 works, and the third phase- the Remedial Phase (future rehabilitation works, including Phase 2 works).

Chapter 4 - Description of Development, Volume 2 defines the baseline year as 1988. Baseline noise has been determined from a noise survey conducted in the vicinity of the Application Site in 2021, when peat extraction at the Application Site had ceased. Operational noise has been assessed against the IPC Licence P0499-01 noise limits set by the Environmental Protection Agency for the Littleton Bog Group in 2001. Noise from site activities has been predicted using BS5228:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites Part 1: Noise. Operational vibration has been assessed based on the criteria defined in BS5228:2009+A1:2014 Part 2: Vibration.

10.1.1 Statement of Authority

Maureen Marsden, Fehily Timoney and Company (FT) is an Acoustic Engineer with a Master of Engineering degree in Acoustics and Vibration and over 20 years' experience in noise and vibration, in particular within industrial noise, including wind farm and solar farm projects. Maureen is a member of the Institute of Acoustics and the Institute of Engineers Ireland. Maureen Marsden undertook the baseline noise survey for the scheme. She has assessed operational noise and vibration for the scheme in preparation of the Noise and Vibration Chapter.

10.1.2 Study Area

Noise has been assessed at the closest noise sensitive locations to the four bog areas (Longfordpass, Littleton, Lanespark and Derryvella) that are considered as part of this assessment. Noise sensitive locations have been considered within 500m of the Application Site boundary that includes all four areas of bog. There are 59 residential only properties, and 18 commercial and residential properties within 500m of the Application Site boundary. There are 3 commercial only properties within 500m of the Application Site boundary and none of these are considered noise sensitive, in accordance with best practice guidance outlined in 10.3.2. Figure 10.1, Volume 4 of this rEIAR shows the Application Site outline along with noise sensitive locations within 500m.

Potential noise has been considered from the four bog areas: Longfordpass, Littleton, Lanespark and Derryvella. The peat extraction areas changed during the Peat Extraction Phase of the project, with peat extraction ceasing at the Application Site in 2017. Noise has been predicted at the location where highest noise is predicted from the adjacent bog area.

10.2 Assessment Methodology

10.2.1 Sound and Noise

Noise is defined as unwanted sound. The impacts of noise are subjective, varying from person to person. Specific factors, such as the existing background noise levels, time of day and the activities being carried out when the person experiences the noise, all affect the noise levels impacts on the receiver.

Perceived noise is quantified as sound pressure levels; the unit of sound pressure level being a decibel (dB). The smallest noise level change perceived by the human ear is 3 dB with a change of 10 dB corresponding approximately to halving (or doubling) the loudness of sound. Another property of the decibel scale is that if a noise source is more than 10 dB less than another noise source, then the total noise level is simply the louder of the two sources.

The use of A-weighted decibels, dB(A), as the basic unit for environmental noise is widely accepted as A-weighting differentiates between different frequencies in a manner similar to how a human perceives these frequencies. A-weighted sound levels emphasise the middle frequencies of the noise spectrum, putting less emphasis on the higher and lower frequencies. A glossary of terms is provided in Appendix 10.1, Volume 3, of this report.

10.2.2 Guidance Documents and Assessment Criteria

The methodology adopted for this noise and vibration assessment is as follows:

- Review of appropriate guidance and specification of suitable operational noise / vibration criteria
- Characterisation of the receiving noise environment
- Prediction of noise to assess potential effect associated with the development
- Evaluation of noise and vibration effects associated with peat extraction and other site activities
- Assess residual impacts

A list of guidance documents that have been used in the assessment of the scheme is shown below:

- Operational Site IPC Licence Ref. (P0499-01)
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), Environmental Protection Agency, 2016
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, May 2022
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)
- Transport Infrastructure Ireland document Guidelines for the Treatment of Noise & Vibration in National Road Schemes, 2004 (TII publication ref. PE-ENV-01110)

- Institute of Acoustics 2013 document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (IOA GPG).

Noise Modelling Standards and Technical Advice:

- British Standard BS 5228 Part 1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise
- British Standard BS 5228 Part 2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration

10.2.3 Noise

A summary of noise criteria applicable to the development are summarised in subsequent sections.

10.2.3.1 Operational IPC Licence

Activities at the Application Site operate under Integrated Pollution Control (IPC) Licence Ref. P0499-01 which was granted by the Environmental Protection Agency in 2001. Details of the licence relating to noise emissions are summarised below.

Daytime is defined in the licence as 0800 hrs to 2200 hrs and night-time as 2200 hrs to 0800 hrs.

A noise sensitive location is defined as "Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels"

Condition 3 Interpretation states:

"*3.4.1 Noise from the activity shall not give rise to sound pressure levels (Leq,30 min.) measured at noise sensitive locations which exceed the limit value(s) by more than 2 dB(A).*

Reason: To clarify the interpretation of emission limit values fixed under the licence"

The IPC Licence, Condition 8 Noise states:

"*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 (Leq,30min) subject to Condition 3:*

8.1.1 Daytime: 55 dB(A),

8.1.2 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.

8.3 The licensee shall carry out a noise survey of the site operations as may be required by the Agency. The licensee shall consult with the Agency on the timing, nature and extent of the survey and shall develop a survey programme to the satisfaction of the Agency. The survey programme shall be submitted to the Agency in writing at least one month before the survey is to be carried out. A record of the survey results shall be available for inspection by any authorised persons of the Agency, at all reasonable times and a summary report of this record shall be included as part of the AER when relevant.

Reason: To provide for the protection of the environment by control of noise. "

As detailed above there is no requirement to monitor noise on an annual basis and the operator is only required to carry out a noise survey if requested by the Environmental Protection Agency.

Bord na Móna have confirmed that "*There have not been any open compliance investigations with the EPA regarding the Applicant's previous IPC Licences, including Ref. P0499-01.*" As such, there are no records of noise monitoring and no recorded noise compliance issues for the Application Site to date.

10.2.3.2 Significance of Impact

The criteria for determining the significance of impacts and the effects are set out in the EPAs 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2022'. The EPA guidelines do not quantify the noise impacts in decibel terms. In absence of such information, reference is made to relevant standards and guidance documents noise limits. If the predicted impact from the operational phase is below the respective noise limits, it is considered that no significant effect occurs.

For this assessment, it has been assumed that dwellings have a medium to high sensitivity. Table 10.1 presents the significance of effect criteria from the EPA guidelines and Table 10.2 presents the Duration and Frequency of effects criteria.

Table 10-1: Description of Effects

Significance of Effects	Criteria
Imperceptible	An effect capable of measurement but without noticeable consequences
Not significant	An effect which causes noticeable changes in the character of 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 in a manner that is consistent with existing and emerging trends
Significant effect	An effect which, by its character, magnitude, duration or intensity significantly 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 effects	An effect which obliterates sensitive characteristics

Table 10-2: Duration and Frequency of Effects

Duration and Frequency of Effects/Significance	Description
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	Effects lasting over sixty years.
Reversible	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly - or hourly, daily, weekly, monthly, annually

10.2.3.3 Project Specific Criteria applied to Littleton rEIAR project

The noise and vibration assessment detailed in this report is high-level in nature, as the type of works varies over time and covers an extensive area, with much of the assessment dealing with historical activities at the site. The key issue with the environmental impact assessment process is to establish the occurrence of significant adverse effects. Based on the IPC limits detailed in 10.2.3.1 above and the Significance of impacts detailed in Table 10-1 above, the onset for a significant adverse effect at noise sensitive properties near the Application Site is based on the site noise limit, which is 55 +2 dB $L_{Aeq,30min}$.

Table 10-1 sets out the description of the range of significance of effects, based on EPAs 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2022'. There is no guidance on how the change in noise level in decibel terms corresponds to the significance of effect categories. The Application Site covers an extensive area and site activities are assessed across a wide area. As detailed in Section 10.1.2, noise sensitive locations within 500m of the site boundary have been considered. When establishing the significance of impact, when predicted noise levels are below the IPC noise limit, there will be a range of categories of effect (Imperceptible, Not significant, Slight effect and Moderate effect), that depends on distance between NSL and site activities.

For effects below the significant adverse effect category, these effects are not categorised in this report, given the high-level nature of this assessment.

10.2.4 Vibration

During the Peat Extraction Phase there was potential for vibration from site vehicles from peat extraction works, including rail movements on the internal rail line used to transport excavated peat from the Application Site. During the Current Phase, activities associated with stockpile removal resulted in internal rail line movements, which have the potential to generate vibration. No rail movements will occur during the Remedial Phase. During all phases, there is potential for generation of vibration from HGV movements on uneven road surfaces.

Operational vibration from the Application Site has the potential to have an effect on human comfort and potential cosmetic damage to buildings. Criteria for human response to vibration in buildings is provided in BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings -Vibration sources other than Blasting provides, summarised in Table 10-3. Guidance on vibration levels from Peak Particle Velocity (PPV) from BS5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration are set out in Table 10-4.

For operational vibration relating to vehicle movements on road surfaces, reference is made to the Transport Infrastructure Ireland document Guidelines for the Treatment of Noise & Vibration in National Road Schemes, 2004 (TII publication ref. PE-ENV-01110). This states regarding operational vibration " *It has been found that ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces. The Authority does not therefore consider it necessary to set limits for vibration during the operational phase of a road scheme.*" With regard to construction vibration, the Guidance document also states that " *In the case of nominally continuous sources of vibration such as traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration."*

Prediction of vibration at distances far from a railway line is complicated by soil and rock structure that widely varies from site to site (Transportation Noise Reference Book, Butterworths, 1987). The viscoelastic properties of the soil which are crucial to prediction of vibration propagation are often not available. Even if these are known the methodology for predicting vibration are very complicated, making it possible to treat analytically only the simplest geometries. Once vibration reaches a building the coupling of the vibration in the soil to the building foundation and propagation through the building structure are also very complicated. The level of vibration from the railway lines would be anticipated to be low as the locomotives would operate at a low speed. In general, vibration is transmitted effectively through a solid structure, such hard bedrock and transmission through peat would be expected to be less likely over long distances. The purpose of this report is to assess vibration from operation of the railway line, historically, during the Peat Extraction Phase and during the Current Phase, during peat stockpile removal. No rail movements are considered during the Remedial Phase works.

Given that rail movements occurred infrequently, the speed of vehicles is low, the distance to vibration sensitive locations is high, and vibration reduces significantly with distance from the source, the likelihood of vibration impacts is low. In addition, Bord na Móna have confirmed that there is no record of noise or vibration complaints from operation of the Application Site. Therefore, vibration from potential activities including peat excavation works, HGV movements and rail movements are likely have been low. Therefore, vibration from activities during the operation of the Application Site will not be considered further in this chapter.

Table 10-3: Vibration dose value ranges which might result in various probabalities of adverse comment within residential buildings (BS 6472: Part 1)

Place and Time	Low Probability of adverse comment $ms^{-1.75}$	Adverse comment possible $ms^{-1.75}$	Adverse comment Possible $ms^{-1.75}$
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Table 10-4: Guidance on the effect of vibration levels (PPV) (British Standards Institute, 2014).

Vibration Level[A) B) C)]	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

10.3 Existing Environment

10.3.1 Establishing the 1988 Baseline Conditions

In absence of baseline noise data from 1988, the baseline noise data from a noise survey conducted in 2021 has been used. At the time of the survey peat extraction at the Application Site had ceased, and decommissioning and Rehabilitation Phase 1 works were being undertaken. However, no noise from works associated with the Bord Na Mona site were noted during equipment deployment and collection. In addition, the closest noise monitoring location was 360m from the Red Line Boundary of the Application Site.

Based on the noise sensitive locations identified in Figure 10-1, Volume 4 of this rEIAR, a noise survey was conducted at six locations in the vicinity of the Application Site over a three-week period between 18th November and 9th December 2021. Further details of noise monitoring locations and equipment are provided in Appendix 10-2, Volume 3. Figure 10-2, Volume 4 of this rEIAR, shows the noise monitoring locations, relative to the Application Site boundary. The noise survey methodology was based on the Institute of Acoustics 2013 document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (IOA GPG).

Noise was monitored at the six locations every 10 minutes and synchronised to the hour. Rain was monitored at location N6, and wind data was also simultaneously monitored at the site. The noise data over the measurement period was filtered to remove periods where rainfall occurred and where windspeeds were greater than 5m/s. The noise levels have been averaged arithmetically over the time periods associated with the IPC licence. The background noise (L_{A90}) and ambient noise (L_{Aeq}) across all locations are summarised in Table 10-5. The main noise sources in the area are noise from the M8 motorway, which runs between Lanespark and Littleton Bog. In addition, other noise sources would typically include road traffic on local roads, and agricultural machinery and activities on adjacent land.

Table 10-5: Summary of Noise Monitoring

Location	Distance to red line boundary (m)	Measured Noise Levels, dB			
		Day (0800-2200)		Night (2200-0800)	
		L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
N1	390	43	35	31	27
N2	1100	39	30	30	24
N3	540	41	31	35	25
N4	440	46	34	35	26
N5	410	39	32	30	25
N6	360	49	43	42	33

10.4 Project Description

Noise predictions have been undertaken for the different phases of the project as described in Chapter 4 - Description of Development, Volume 2.

- Peat Extraction Phase (July 1988 to 2017).
- Current Phase (2017 to present day comprising Decommissioning and Rehabilitation Phase 1)
- Remedial Phase (future rehabilitation works, including Phase 2 rehabilitation works).

The noise assessment assumes that works take place during the daytime period only. Noise predictions were undertaken to determine the likely impact during the different project phases based on prediction methodology in British Standard: BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites. This standard is typically used for construction and open sites, including mineral extraction, which is considered similar to the peat extraction activities undertaken at the development.

Based on details presented in the Description Chapter 4 - Description of Development, Volume 2 of this rEIAR as well as a review of other chapters of the rEIAR, noise from the typical equipment used at the Application Site has been predicted.

10.4.1 Noise Prediction Methodology

Noise modelling was carried out using guidance and plant noise data from BS 5228:2009+A1:2014. The following sections 10.4.2 to 10.4.4 describe the type of activity that is undertaken during the three phases of the project and describes the type of plant and equipment that form the basis of the noise assessment.

Noise predictions were undertaken using Predictor 3-D Noise modelling software V2022.1 Rev 2. The noise predictions assume that the ground cover is a mix of acoustically hard and soft ground with a ground cover of G=0.75 to allow for pockets of acoustically hard ground. Noise was predicted at the closest noise sensitive location to the works during each phase. For the Peat Extraction Phase, the closest distance depends on the year of extraction and in most instances was setback from the redline boundary of the Application Site.

10.4.2 Peat Extraction Phase 1988 – 2017

By 1988, the land use at the Application Site was well established as industrial peat extraction. All bogs were fully drained and milled peat extraction was the only form of peat extraction taking place across the Application Site in 1988. By 1998, railway infrastructure was laid on all bogs. Table 10-6 below describes the general activities within the Application Site over a calendar year during each of the four quarters of any given year during the peat extraction phase.

Table 10-6: 1988 Peat Extraction Activities

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump maintenance, stockpile removal, peat transportation, silt pond maintenance
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 maintenance, stockpile removal, peat transportation, silt pond maintenance

The types of machines used during the Peat Extraction Phase are detailed in Chapter 4 - Description of the Development, Volume 2 of this EIAR Section 4.2. and are summarised below.

Peat Extraction Phase equipment that had the potential to generate noise are summarised below:

- Tracked excavator
- Dozer
- Tractors used most commonly with different attachment for different extraction phases (miller, harrow, ridger). Typical operational speed is 5 km/hr.
- Motorcycle
- Locomotive with wagons

Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

Based on the description above for the Peat Extraction Phase the equipment and sound power levels that form the basis of the noise assessment are summarised below. These items of plant are chosen as they represent the items of plant that would typically operate on a typical day. The other items of plant listed above were not considered, on the basis that they were used intermittently.

Table 10-7: Summary of equipment during Peat Extraction Phase

Plant	Activity	BS 5228 Ref	Moving source Operational Speed
1 No. Tractor with attachment	Milling, harrowing, ridging	C3.75	5km/hr
1 No. Locomotives with wagon	Transport of peat to main line and transport of peat to Littleton briquette factory.	C3.75	5km/hr

10.4.3 Current Phase

10.4.3.1 Decommissioning and Rehabilitation Phase 1 works (July 2017 to Present Day)

The Current Phase comprises the Decommissioning Phase in addition to Rehabilitation Phase 1 works, as detailed in Section 4.8 of Chapter 4 - Description of Development, Volume 2. Decommissioning Phase equipment includes:

- Tracked excavator
- Locomotives and wagons

Typical decommissioning works include peat stockpile removal and removal of rail infrastructure. Decommissioning works includes removal, disposal and recovery of site infrastructure including equipment, plant, waste materials, buildings, equipment and waste from the site. This phase also includes silt pond cleaning, decommissioning of fuel tanks and septic tanks and removal of bog pumps. This phase also includes minor works such as drainage maintenance.

Decommissioning works to remove peat stockpiles from the Application Site was completed in 2019. Rail infrastructure was removed from Lanespark and Derryvella by 2024.

The rehabilitation works forming part of the current phase include Rehabilitation Phase 1 works commenced in 2018 across all four bogs. The main activities are drainage works (drain blocking and hydrological management), monitoring, aftercare and maintenance including silt pond maintenance. Rehabilitation Phase 1 works were completed at the four bogs between 2018-2021.

A summary of the equipment used for the noise predictions for the Rehabilitation works are summarised in Table 10-8.

Table 10-8: Summary of equipment during Current Phase

Plant	Activity	BS 5228 Ref	Moving source Operational Speed	% On-time
1 No. Tracked excavator	Drainage works	C10.1	N/A (static plant)	10%
1 No. Locomotives with wagon	Transport of peat stockpiles to main line	C3.75	5km/hr	100%

10.4.4 Remedial Phase

Rehabilitation Phase 2 works are detailed in Section 4.9, Chapter 4 - Description of Development, Volume 2.

The main focus of rehabilitation works is at Derryvella Bog. The main activities are drain blocking and hydrological management. This includes drain blocking - creation of peat dams within small drainage channels on the cutover bog, and removal or blocking of drainage pipes or modification of drainage levels where required.

There will be ongoing works including monitoring/evaluation/maintenance/decommissioning of silt ponds at all Bogs into the future.

The plant that has been assumed for the rehabilitation works are summarised in Table 10-9.

Table 10-9: Summary of equipment during Remedial Phase

Plant	Activity	BS 5228 Ref	Moving source Operational Speed	% On-time
1 No. Tracked excavator	Drainage works	C10.1	N/A (static plant)	10%

10.5 Assessment of significant noise effects

10.5.1 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 proposed project not be carried out. As discussed in Section 3.3, 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 3.3, peat extraction activities commenced at the Application Site in 1941 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.3 of Chapter 4 - Description of the Development, Volume 2) 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, IPC Licence Ref. P0499-01 would not have been granted by the EPA in 2001, and associated 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 practice 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 ancillary activities have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2017 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.

The closest noise sensitive locations are identified as being between 20m and 250m from the Application Site boundary of the four bog areas. It would be expected that there would be a reduction in noise from peat extraction and ancillary activities and these would be greatest at locations near Lanespark Bog and Littleton Bog, as these are the closest locations to the Application Site. In the Do Nothing Scenario, there would be a noise reduction which would have positive impact. However this change in noise does not consider other uses of the land that may have generated alternative noise sources, such as from agriculture, forestry or commercial uses, which would have been likely to increase the noise within the general area.

10.5.2 Peat Extraction Phase 1988–2017

The equipment used to assess noise during the peat extraction phase is discussed in section 10.4.2 above and set out in Table 10-7.

As detailed in section 10.4.2, for the typical operational scenario during peat extraction and ancillary activities, it has been assumed that a tractor with suitable attachments, depending on the peat extraction stages operated continuously at a low speed (5km/hour) across each bog area. In addition, it has been assumed that one locomotive operated constantly across each of the bog areas. As the other machinery used on site is used on a more sporadic basis, this has not been assessed under the typical operational scenario (see Table 10-7).

Figures 4.4 to 4.7 in Chapter 4 - Development Description, Volume 2 of this rEIAR showing the extent of areas subject to peat extraction across the years of this assessment namely 1988, 1995, 2004 and 2017.

Table 10-10 presents the predicted noise level at the closest NSL to the peat extraction area for each bog during these years.

The assessment assumes that peat extraction was transported via rail and not by HGV movements on adjacent roads.

Table 10-10: Peat Extraction - Predicted Noise Levels during Peat Extraction phases 1988 to 2017

Bog	Predicted Noise level at closest NSL L_{Aeq}, dB			
	1988 (distance to NSL)	1995 (distance to NSL)	2004 (distance to NSL)	2017 (distance to NSL)
Longfordpass	37 (310m)	37 (310m)	37 (310m)	37 (310m)
Littleton	42 (170m)	40 (190m)	40 (170m)	38 (170m)
Lanespark	42 (50m)	41 (145m)	39 (120m)	39 (120m)
Derryvella	42 (37m)	42 (37m)	42 (37m)	42 (37m)

Table 10-10 shows that noise generated during tractor and locomotive movements when averaged across the bog area is predicted to be low and is significantly below the IPC Licence noise limit of 55 dB $L_{Aeq, 30min}$+2 dB. Therefore, the predicted noise level at all bogs are predicted to be within the IPC Licence noise limits. Noise is predicted at the closest NSL to the Application Site, representing the highest noise levels predicted from peat extraction activities, which take place between 37m and 310m from the nearest peat extraction area.

In practice, for works that took place less than 50m from a property there may have been temporary periods when the IPC Licence noise limit of 55 dB $L_{Aeq, 30min}$+2 dB was briefly exceeded. However, the nature of the peat extraction and ancillary activities was that the noise source moves across a wide area (and was not a static source) and in practice, on average, the noise was generated across a very large area, . The NSLs are located along local roads near the bog and the noise levels generated by on-site machinery were similar to noise levels that would be generated by either cars on local roads or agricultural machinery in adjacent fields.

The IPC daytime specifies a noise limit of 55 dB $L_{Aeq, 30min}$ and states that noise from the site must not exceed the limit by 2 dB over any 30-minute interval.

The IPC daytime noise limits are not predicted to be exceeded at the closest NSL's to the bogs based on the typical operational scenario during the Peat Extraction Phase.

The noise impact of peat extraction and ancillary activities during the Peat Extraction Phase ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is long term in nature, closer to site activities.

10.5.3 Current Phase - (Decommissioning and Rehabilitation Phase 1)

Noise has been predicted for activities associated with the decommissioning phase and Rehabilitation Phase 1. The basis of this assessment is that the following equipment is used for the decommissioning part of the works.

The rehabilitation works are more likely to occur near the drainage channels, and where the infrastructure elements are to be decommissioned. It is likely to involve less intensive use of plant than during the peat extraction and decommissioning phases and is likely to be spread out more around the bogs.

Decommissioning works includes removal of stockpiles and therefore noise from rail vehicles have been assumed for decommissioning works, as detailed in Table 10-8.

For drainage works associated with the Rehabilitation Phase 1 it has been assumed that this will involve one excavator . It has been assumed that this will operate for 10% of the time. For drainage works, it has been assumed that only one item of plant will operate at a time. The distance to the drainage works is based on the extent of the drainage area in 2017 ('Drained not Subject to Peat Extraction'). For this assessment it has been assumed that drainage works will occur across all four sites. For Derryvella drainage works has been assessed at 50m from the nearest noise sensitive locations. For the decommissioning works, it has been assumed that this takes place over the extent of peat extraction area in 2017. Table 10-11 sets out the predicted noise levels from likely plant during these two phases of works.

Table 10-11: Current Phase (Decommissioning plant and Rehabilitation Plant)- Predicted Levels

Bog	Predicted Noise level at closest NSL L_{Aeq}, dB		
	Decomissioning works 2017 to 2024(distance to NSL)	Drainage maintenance(distance to NSL)	Cumulative (Decommissioning and Drainage maintenance)
Longfordpass	37 (310m)	41 (325m)	42
Littleton	38 (170m)	47 (160m)	47
Lanespark	39 (120m)	48 (140m)	49
Derryvella	42 (37m)	57*(50m)	57*
* Based on works restricted to 50m from the closest property			

In summary, during the Current Phase, with both decommissioning and Rehabilitation Phase 1 works, the predicted noise is within the Application Site IPC Licence noise limits of 55 dB $L_{Aeq,30min}$ +2dB at the closest NSLs to the site.

Therefore, there is predicted to be an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is long term in nature.

10.5.4 Remedial Phase

Rehabilitation Phase 2 works are the proposed future works during the Remedial Phase and involve works at the Derryvella bog including, drain management and silt pond maintenance. No additional works are required during Rehabilitation Phase 2 at the remaining bogs (Littleton, Longfordpass and Lanespark). There will be ongoing works including monitoring/evaluation/maintenance/decommissioning of silt ponds at all Bogs into the future under Rehabilitation Phase 1.

During this stage of the works there is a significant reduction in the activities that occur on site and therefore the potential noise is much reduced. For drainage works associated with Rehabilitation Phase 2 it has been assumed that this will involve one tracked excavator, as detailed in Table 10-9. It has been assumed that this will operate for 10% of the time. For drainage works, it has been assumed that only one item of plant will operate at a time. Table 10-12 sets out the predicted levels at fixed distances from the works. At Derryvella, no remediation works will likely take place within 50 meters of an NSL.

Table 10-12: Remedial Phase - Predicted Level

Bog	Predicted Noise level at closest NSL L_{Aeq}, dB
	Drainage maintenance
Longfordpass	41
Littleton	46
Lanespark	49
Derryvella	57*
* Based on works restricted to 50m from the closest property	

Table 10-12 presents the predicted noise level at the closest NSLs to the bogs, from drainage maintenance works. These will occur occasionally, when maintenance is required and have the potential to continue for up to 30 years. Table 10-12 indicates that the predicted noise levels drainage works are within the site IPC Licence noise limits of 55 dB $L_{Aeq,30min}$ +2dB at the closest NSL

In summary, the proposed Rehabilitation Phase 2 works are predicted to have a range of effects between an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is long term in nature, closer to Rehabilitation Phase 2 site activities.

10.6 Cumulative and Indirect Impacts

As stated in Chapter 2 - Background, Volume 2, the future phase of the remedial works are assessed with the proposed Littleton WF site. More details of the projects considered in the cumulative are provided in Appendix 2-2, Volume 3. There are a number of additional windfarms in either proposed or constructed, as detailed in Appendix 2-2, Volume 3 of the rEIAR. From the list of non-windfarm projects, none of these are of a scale or close to the Application Site where cumulative noise will contribute to noise from operation of the project site.

Noise indices and assessment methods are developed depending on the type of noise source and character. There is no guidance for assessing cumulative noise from a number of different types of noise sources. When considering the potential cumulative assessment of the windfarm in conjunction with works at the Application Site, the noise limits normally applied to windfarms need to be considered. Only daytime limits for windfarms are considered, as the Application Site and the Remedial Phase works will only operate during the daytime. The Wind Energy Development Guidelines 2006 contain recommended noise limits to control operational noise from wind farms and state...

In general, a lower fixed limit of 45 dB(A) or a maximum increase of 5dB(A) above background noise at nearby noise sensitive locations is considered appropriate to provide protection to wind energy development neighbours. However, in very quiet areas, the use of a margin of 5dB(A) above background noise at nearby noise sensitive properties is not necessary to offer a reasonable degree of protection and may unduly restrict wind energy developments which should be recognised as having wider national and global benefits. Instead, in low noise environments where background noise is less than 30 dB(A), it is recommended that the daytime level of the LA90,10min of the wind energy development noise be limited to an absolute level within the range of 35-40 dB(A).

In summary, for the daytime, the windfarm will typically need to meet a noise limit of 45 dBA $L_{A90,10mins}$ or a limit of between 35-40 dB if in a low noise environment. As the windfarms noise limit is more than 10 dB below the IPC noise limit at the site, 55 dB $L_{Aeq,30min}$ +2 dB. Windfarm noise would not be predicted to contribute to noise from the bog operations.

10.7 Summary of Potential Impacts

Table 10-13 summarises the potential impacts from the development.

The noise impact of peat extraction and ancillary activities during the Peat Extraction Phase ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is **long term** in nature, closer to site activities.

Table 10-13: Summary of potential Impacts

Activity/Source of Impact	Potential Impact*	Description of Effects
Without Mitigation		
Peat Extraction 1988 to 2017	Peat Extraction and ancillary activities	Ranges from **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is **long term** at properties closer to site activities.
Current Phase (Decommissioning and Rehabilitation Phase 1)	Decommissioning and Drainage works	Ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term**
Remedial Phase	Drainage works/maintenance	Ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term**
* Based on works restricted to 50m from the closest property at Derryvella bog		

10.8 Mitigation and Monitoring Measures

10.8.1 Peat Extraction Phase 1988 – 2017

As noise generated during the Peat Extraction Phase were not predicted to have a significant adverse effect (see Section 10.5.2) and therefore no mitigation was identified as being required. The IPC Licence (P0499-01) applied to the Littleton Bog Group (inclusive of the Application Site) from August 2001 onwards. Bord na Móna were required to undertake a noise survey, as may be required by the Agency. Bord na Móna have indicated "*There have not been any open compliance investigations with the EPA regarding the Applicant's previous IPC Licences, including Ref. P0499-01.*" As such, there are no recorded noise compliance issues for the Application Site to date.

Also, Bord na Móna have indicated that there have been no complaints of noise from the Application Site between 1998 and 2001.

As described in the Chapter 4 - Description of Development, Volume 2, site vehicles were regularly inspected and maintained on site. This is a recommendation of BS5228 to minimise noise emissions.

Under Condition 8 of the existing IPC licence, Bord na Móna are obliged to undertake noise monitoring as may be required by the Environmental Protection Agency.

10.8.2 Current Phase (Decommissioning and Rehabilitation Phase 1)

As noise generated during the Current Phase were not predicted to have a significant adverse negative effect (see Section 10.5.3), based on the setback distance at Derryvella bog, no additional mitigation was identified as being required. The IPC licence applies to the Application Site operations which include activities undertaken during the remedial phase. Under the licence Bord na Móna are required to undertake noise monitoring if required by the Environmental Protection Agency.

10.8.3 Remedial Phase

As noise generated during the Remedial Phase was not predicted to have a significant adverse effect (see Section 10.5.4), based on the setback distance at Derryvella bog, no additional mitigation was identified as being required. The IPC licence applies to the Application Site operations which include activities undertaken during the Remedial Phase. Under the licence Bord na Móna are required to undertake noise monitoring if required by the Environmental Protection Agency.

Should the proposed Littleton Wind Farm obtain planning permission, should the planning condition include a requirement for noise compliance monitoring, this will be required to be undertaken by the site operator.

Where Rehabilitation Phase 2 works occur, the works will not occur within 50m of an NSL.

10.9 Residual Effects

10.9.1 Peat Extraction Phase 1988 – 2017 (Drainage, Peat Extraction & Associated Activities)

Noise generated during this phase is not predicted to have a significant adverse effect. Noise generated during this phase ranges from **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is **long term** in duration at properties closer to site activites..

10.9.2 Current Phase (July 2017 to Present Day)

Noise generated during this phase is not predicted to have a significant adverse effect. There is predicted to be an effect ranging from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term.**

10.9.3 Remedial Phase

Noise generated during this phase is not predicted to have a significant adverse effect. There is predicted to be a effect ranging from **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term**. This is based on the distance restriction at Derryvella bog.

10.9.4 Summary of Residual Impacts

Table 10-14 summarises the residual impacts from the development.

Table 10-14: Summary of residual Impacts

Activity/Source of Impact	Potential Impact	Description of Effects
Peat Extraction 1988 to 2017	Peat Extraction	Ranges from **imperceptible effect** at properties furthest from site activities to a **slight negative effect** that is **long term** at properties closer to site activities.
Current Phase (Decommissioning and Rehabilitation Phase 1)	Decommissioning and Drainage works	Ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term**
Remedial Works	Drainage works/maintenance (Longfordpass, Littleton and Lanespark) and Derryvella*)	Ranges from an **imperceptible effect** at properties furthest from site activities to a **slight negative effect** at properties closer to site activities that is **long term**
* Based on works restricted to 50m from the closest property at Derryvella		

10.10 Major Accidents and Natural Disasters

The project has been examined with respect to potential noise impact from major accidents and natural disasters. This relates to:

- flooding
- fire
- major incidents involving dangerous substances
- catastrophic events

There has not been any accident or natural disaster that would have created a noise or vibration effect at noise-sensitive locations. Should a major accident or natural disaster occur in the future, the potential noise impact is limited to emergency vehicles using local roads near the site and travelling at higher speeds with emergency sirens. There is no anticipated difference in relation to operation noise impacts from major accidents and natural disasters.

10.11 References

Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), Environmental Protection Agence, 2016.

Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, May 2022

Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).

International Standard ISO 9613-2: 2024 Attenuation of sound during propagation outdoors, Part 2: General method of calculation;

British Standard BS 5228 Part 1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise;

British Standard BS 5228 Part 2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 21: Vibration;

British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound.

Institute of Acoustics Good Practice Guide (IOA GPG) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (2013)

PA Nelson, Transportation Noise Reference Book, Butterworth Press, 1987.

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