11. NOISE AND VIBRATION

11.1 Introduction

11.1.1 Background & Objectives

This chapter of the rEIAR assesses the potential for any likely significant effects of noise and vibration arising from the past peat extraction activities and all ancillary works, at Ballivor, Bracklin, Carranstown, Lisclogher, and Lisclogher West bogs (hereafter "the Application Site"), during the Peat Extraction Phase, the Current Phase and the Remedial Phase. The Application Site which is the subject of this substitute consent application to An Bord Pleanála, in accordance with Section 177E (Application for Substitute Consent) of the Planning and Development Act 2000 (as amended) and under Part 19 of the Planning and Development Regulations, 2001 (as amended).

Noise impact assessments have been prepared for the Peat Extraction Phase, the Current Phase, and the Remedial Phase of the Project at the nearest Noise Sensitive Locations (NSLs) to the Application Site. To inform this assessment, background noise levels have been measured at several locations, representative of the nearest NSLs in the vicinity of the Application Site to assess the potential impacts associated with the peat extraction activities and all ancillary works at the Application Site.

The activities at the Application Site operate under an Integrated Pollution Control licence from the EPA (Reg. P0501-01; hereafter the "IPC Licence") which sets noise emission limits. NSLs in this context are any occupied dwelling house, hostel, health building or place of worship and may include areas of particular scenic quality or special recreational amenity importance. In this instance all of the NSLs are dwellings.

It is important to note that in the case of environmental noise in general, once a noise-generating activity has ceased, any environmental noise effects also stop, and there is no effect which persists after the noise has stopped.

11.1.2 Statement of Authority

This chapter of the rEIAR has been prepared by the following staff of AWN Consulting Ltd:

Mike Simms

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

Dermot Blunnie

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

11.1.3 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as outlined in Section 2.6 of Chapter 2 of the rEIAR.

11.2 Fundamentals of Acoustics

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. To take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB). The audible range of sounds expressed in terms of SPL is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3 dB. The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. The 'A-weighting' system defined in the international standard, BS ISO 226:2003 Acoustics. Normal Equal-loudness Level Contours has been found to provide the best correlations with human response to perceived loudness. SPLs measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 11-1. For a glossary of terms used in this chapter please refer to Appendix 11-1.

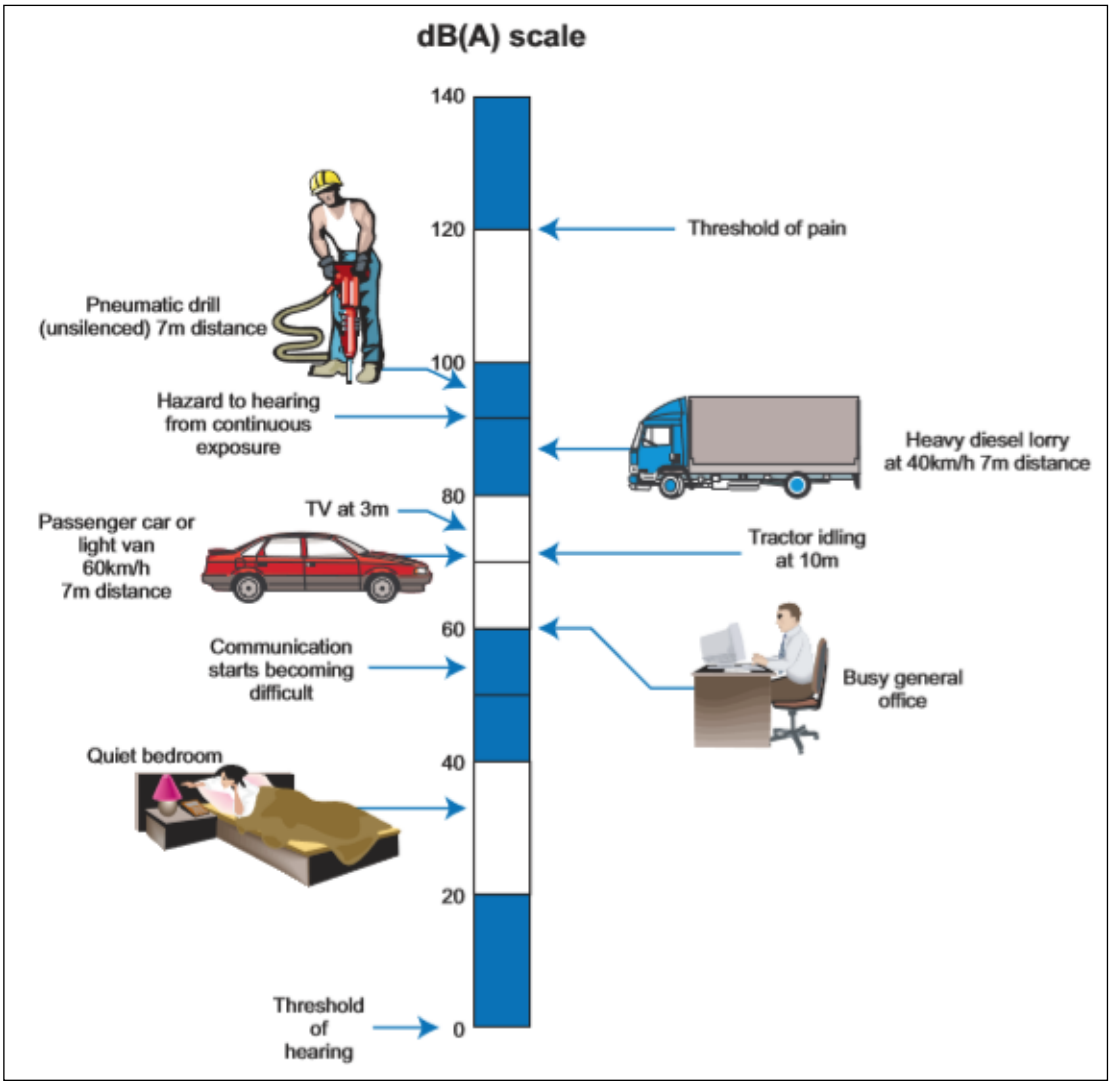

Figure 11-1 The level of typical common sounds on the dB(A) scale (NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004)

11.3 Assessment Methodology

The assessment of impacts has been undertaken with reference to the most appropriate guidance documents relating to noise and vibration for the past peat extraction activities and all ancillary works, which are set out within the relevant sections of this chapter.

In addition to the specific guidance documents outlined below, the Environmental Impact Assessment (EIA) guidelines listed in Chapter 1 Introduction were considered and consulted for the purposes of preparing this rEIAR chapter.

The methodology adopted for this noise impact assessment is summarised as follows:

- Review of appropriate guidance to identify appropriate noise and vibration criteria for the Peat Extraction Phase, Current Phase and Remedial Phases;
- Characterise the receiving environment through baseline noise surveys at various NSLs surrounding the Application Site;
- Undertake predictive calculations to assess the potential impacts associated with the Project phases and related activities at NSLs;
- Evaluate the potential noise and vibration impacts and effects; and,

- Describe the significance of the residual noise and vibration effects associated with the peat extraction activities and all ancillary works at the Application Site.

11.3.1 EPA Description of Effects

The significance of effects of peat extraction activities and all ancillary works shall be described in accordance with the EPA guidance document *2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*. Details of the methodology for describing the significant of the effects are provided in Chapter 1 – Introduction.

The effects associated with the peat extraction activities and all ancillary works are described with respect to the EPA guidance in the relevant sections of this chapter.

11.3.2 Guidance Documents and Assessment Criteria

The following sections review best practice guidance that are considered appropriate to developments such as peat extraction within the Application Site. Although peat extraction activity at the Application Site took place between the years 1948 to 2020, the approach here is to assess the impacts of activities at the Application Site from 1988 onwards, using the current appliable IPC Licence Reg No P0501-01 which was granted by the EPA in April 2000, when noise limits for the activities at the Application Site first came into place. The IPC Licence was amended on 27th September 2012, 18th June 2013 and 25th February 2014. If it can be shown that the peat extraction activities and all ancillary works meet the noise criteria defined in the IPC Licence, then it can be concluded that the Application Site operated and is operating without significant noise impact.

11.3.2.1 Noise

As discussed above in Section 11.3.2, the activities at the Application Site governed by the IPC Licence which imposes noise limits on the onsite activities.

As activity on site was, is and will be carried out in daytime and evening hours only (note, peat extraction may have occasionally gone on into the evening hours during the summer only when weather permitted), the relevant noise level limit is 55dB $L_{Aeq,30min}$ at NSLs. This noise criterion is applied to the Peat Extraction Phase, the Current Phase and Remedial Phase; this is considered appropriate as the activities in each phase formed or will form part of the normal scheduled activities at the site for that period.

11.3.2.2 Vibration

Reference is made to BS 6472-1:2008 (BSI 2008) which provides the following Vibration Dose Value (VDV) ranges as in Table 11-1 which result in various probabilities of adverse comment (i.e. complaints) resulting from exposure to vibration within residential buildings. An adverse comment is an unfavourable human reaction or response.

Table 11-1 BS 6472 Table 10.5: VDV ($m/s^{1.75}$) above which various degree of adverse comment may be expected in residential buildings

Building Type	Low probability of adverse (1)	Adverse comment possible	Adverse comment probable (2)
Residential building – Day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building – Night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Note 1) Below these ranges adverse comment is not expected. Note 2) Above these ranges adverse comment is very likely.

11.3.3 Background Noise Assessment

Reference is made to the background noise survey undertaken at the Application Site as part of the proposed Ballivor Wind Farm development (ABP Ref. PA25M.316212) to determine baseline noise levels in the receiving environment. The relevant details are discussed in the following sections.

11.3.3.1 Choice of Measurement Locations

Noise monitoring at sensitive receptors was not undertaken during the Peat Extraction Phase. However, noise monitoring was undertaken as part of the proposed Ballivor Wind Farm planning application. The representative background noise levels taken at sensitive locations around the Application Site are used to ascertain typical background noise levels during the Peat Extraction Phase. Coordinates for the noise monitoring locations are detailed in Table 11-2 and illustrated in Figure 11-2.

Table 11-2 Measurement Location Coordinates

Location	Coordinates – Irish Transverse Mercator (ITM)	
	X (ITM)	Y (ITM)
A (H094)	663929	760400
B (H115)	666471	759713
C (H103)	664791	757635
D (H059)	662819	756051
E (H113)	664640	756125
G (H198)	666769	752349
H (H218)	659185	757155

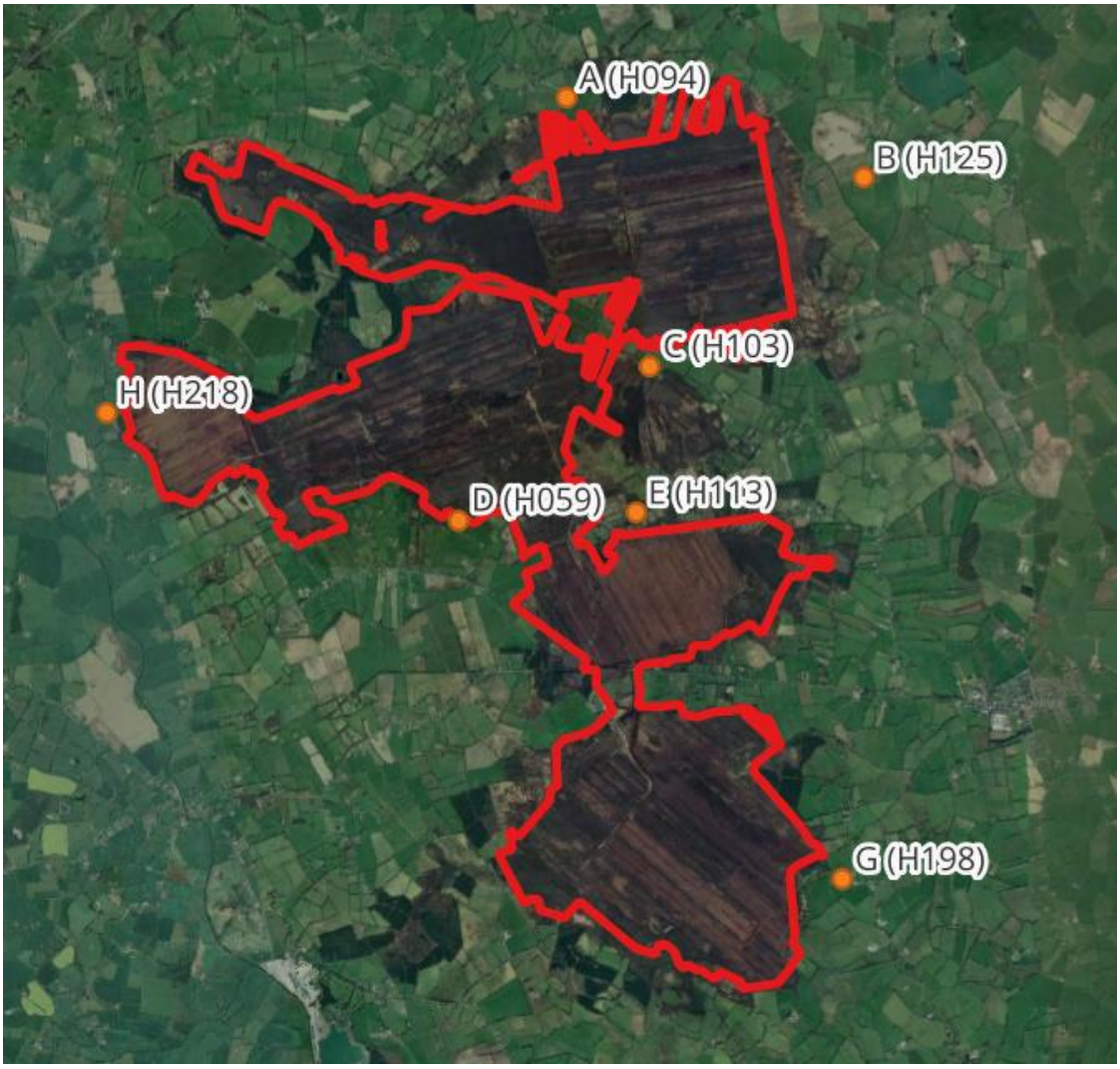

Figure 11-2 Indicative measurement locations (A, B, C, D, E, F and G).

Significant noise sources in this area were noted to be distant traffic movements, activity in and around the residences and wind generated noise from local foliage and other typical anthropogenic sources typically found in such rural settings. Flowing water was audible at some locations. The noise monitoring was undertaken during the Current Phase when peat stockpile removal was underway; therefore, the machinery listed in Section 11.5.2 was present and operating at the Application Site during the monitoring period.

11.3.3.2 Measurement Periods

Noise measurements were conducted at each of the monitoring locations over the periods outlined in Table 11-3.

Table 11-3 Measurement Periods

Location	Start Date	End Date
A (H094)	25 August 2020	27 October 2020
B (H115)	29 August 2020	28 October 2020
C (H103)	25 August 2020	23 October 2020

D (H059)	25 August 2020	28 October 2020
E (H113)	25 August 2020	26 October 2020
G (H198)	25 August 2020	18 October 2020
H (H218)	25 August 2020	22 October 2020

A variety of wind speed and weather conditions were encountered over the survey periods in question. As discussed below, the data collected during the survey in support of the proposed Ballivor Wind Farm planning application was filtered to remove windy periods for the Peat Extraction Phase, Current Phase and Remedial Phase noise impact assessment.

11.3.3.3 Personnel and Instrumentation

AWN Consulting installed and removed the noise monitors at all locations. Battery checks and meter calibrations were carried out part-way through the survey periods. Table 11-4 details the instrumentation used at the various monitoring locations.

Table 11-4 Instrumentation Details

Location	Equipment	Serial Number	Max. Calibration Drift (dB)
A (H094)	Rion NL-52	186671	0.2
B (H115)	Rion NL-52	186671	0.2
C (H103)	Rion NL-52	186670	0.1
D (H059)	Rion NL-52	575785	0.2
E (H113)	Rion NL-52	575802	0.1
G (H198)	Rion NL-52	164427	0.1
H (H218)	Rion NL-52	998409	0.2

Before and after the survey the measurement apparatus was check calibrated using a sound level calibrator where appropriate. Instruments were calibrated on each interim visit and any drift noted. Relevant calibration certificates are presented in Appendix 11-2.

Rainfall was monitored and logged using a Texas Instruments TR-525 console and a data logger that was installed on-site for the duration of the surveys. This allows for the identification of periods of rainfall, which allows for the removal of sample periods affected by rainfall from the noise monitoring data sets in line with best practice when calculating the prevailing background noise levels.

11.3.3.4 Procedure

Measurements were conducted at the seven locations over the survey periods outlined in Table 11-3. Data samples for all measurements (noise, rainfall and wind) were logged continuously at 10-minute interval periods for the duration of the survey. Daytime baseline levels were established by removing measured data when the wind speeds were typically above 5 m/s, and by also removing noise levels measured during wet conditions.

11.3.4 Noise Calculations

British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise is appropriate for open sites such as the Application Site. The standard contains a calculation method for noise propagation from machinery across different types of ground can take account of screening and the 'on-time' of different items, to calculate a $L_{Aeq,T}$ at a noise-sensitive location which can be compared to the adopted operational noise criterion.

11.4 Establishing the 1988 Baseline Conditions

By 1988, peat extraction activities and all ancillary works were well established at Lisclogher, Bracklin and Ballivor bogs and underway in the western portion of Carranstown bog. Drainage was fully inserted in all bogs with the exception of Lisclogher West, where drainage had been partially but not fully inserted by 1988. Railway infrastructure was laid on all bogs except Lisclogher West. As noise measurements are not available from the baseline year, 1988, the results of the recent noise survey undertaken to support the Ballivor Wind Farm planning application are presented here. Measured noise levels, filtered in accordance with the procedure in Section 11.1.1 are presented in Table 11-5.

Table 11-5 Measured Noise Levels

Location	Period	L_{Aeq}	L_{A90}
A	Day	62	28
	Evening	55	23
	Night	37	19
B	Day	51	33
	Evening	43	28
	Night	31	34
C	Day	43	29
	Evening	37	25
	Night	37	22
D	Day	43	29
	Evening	39	21
	Night	32	>20
E	Day	47	28
	Evening	37	22
	Night	34	>20
G	Day	54	30

Location	Period	L_{Aeq}	L_{A90}
	Evening	49	26
	Night	31	22
H	Day	65	49
	Evening	61	44
	Night	52	40

11.5 Project Description

For a detailed description of the Peat Extraction Phase, the Current Phase and Remedial Phase please refer to Chapter 4 Description of Development. The below outlines the noise emanating specific elements of the Peat Extraction Phase, the Current Phase, and the Remedial Phase.

11.5.1 Peat Extraction Phase (1988 - 2020)

As outlined above, by 1988 peat extraction was well established at Lisclogher, Bracklin and Ballivor bogs and underway in the western portion of Carranstown bog. Drainage was fully inserted in all bogs with the exception of Lisclogher West, where drainage had been partially but not fully inserted by 1988. By 1988, railway infrastructure was laid on all bogs except Lisclogher West. From 2003 onwards, peat extraction was limited to Ballivor, Carranstown and Bracklin West bogs, with third-party sod extraction taking place in Lisclogher bog (refer to Chapter 4 for further detail). The annual breakdown of primary activities associated with the Peat Extraction Phase are outlined in Table 11-6.

Table 11-6 Annual Peat Extraction Activities 1988-2020

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

The types of noise generating peat extraction machines used during the Peat Extraction Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEIAR and are summarised below.

- Drainage and Bog Preparation Machinery such as Dragline/Shovel Excavator
- Peat Extraction Machinery such as:
  - Tractors (H.D, LHT, and Ridger)
  - Windrow Machine
  - Sod Moss Peat Collector
  - Milled Peat Harvester

- Dump Truck
- Wheeled Loader Lorry;
- Track Excavator;
- Dozer;
- Dewatering Pumps;
- Rail Lifter;
- Locomotive and Wagons;
- Motor Cycles; and,
- Service Vehicles.

In addition to these machines, delivery trucks exported peat which had been extracted at the Application Site and transported to Ballivor Works via internal rail, and from there to its end destination by truck, with unladen trucks returning to Ballivor Works daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

From 2000 onwards, the Application Site has operated under IPC Licence P0501-01. Condition 8 of the IPC Licence includes the following limits on noise levels:

Condition 8:

8.1 *Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($L_{eq,30min}$) subject to Condition 3 of this licence:*

Day-time: 55 dB(A)

Night-time: 45 dB(A).

8.2 *There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.*

Condition 3:

3.3 Noise

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

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

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

11.5.2 Current Phase (2020 – Present)

Peat extraction ceased at the Application Site in June 2020. During the Current Phase, the activity on site is much reduced when compared to the Peat Extraction Phase. On site activities are limited to removal of the existing peat stockpiles from Bracklin and Ballivor Bogs, which was completed by the end of 2023. The types of noise generating machines during the Current Phase are listed below in Table 10-3. In addition to these machines, delivery trucks exported peat which had been extracted at

the Application Site and transported to Ballivor Works via internal rail, from Ballivor Works to its end destination, with unladen trucks returning to Ballivor Works daily. Vehicular traffic also arose from the movement of personnel to and from the Application Site in the mornings and evenings.

However, due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, these movements are at a much lesser volume than during the Peat Extraction Phase. The onsite machinery which are used during the Current Phase are detailed in Section 4.2.2 and Section 4.2.3 in Chapter 4 of this rEIAR, and are summarised listed below:

- Wheeled Loader Lorry;
- Track Excavator;
- Locomotive and Wagons;
- Dump Truck; and,
- Tractors.

Section 11.6.3 presents the noise assessment for the Current Phase. Based on the predicted noise levels, the Application Site has been in full compliance with the noise limits set out in the IPC Licence during the Current Phase.

11.5.3 Remedial Phase

The Remedial Phase refers to managed rehabilitation of the bogs in accordance with the requirements of Condition 10 of the IPC Licence. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The rehabilitation of the Application Site will support biodiversity e.g., plants, insects, bird and mammals, and the formation of wetland habitats. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity, habitat regeneration and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

It is a requirement of 'Condition 10 Cutaway Bog Rehabilitation' of the IPC Licence that Bord na Móna, following decommissioning of use of all or part of their bogs, prepares (to the satisfaction of the EPA) and implements a Cutaway Decommissioning and Bog Rehabilitation Plan. Ecologists and site managers will visit the Application Site regularly for monitoring purposes. Noise generating machinery will be limited to occasional tractors or excavators to facilitate in the drain blocking process across the Application Site. These activities will be limited to the first 2 years of the phase. In addition, ecologists and site managers will travel to and from the site daily in light goods vehicles (LGVs) to oversee these activities. All peat stockpiles have been removed from the Application Site as of 2023, and as such no Heavy Goods Vehicles (HGVs) movements associated with the removal of extracted peat from Ballivor Works are anticipated to be required during the Remedial Phase. The onsite machinery to be used during year 1 and 2 of the Remedial Phase are listed below:

- Tracked Excavator, and
- Tractor.

From year 3 onwards, the only vehicles on site will be infrequent site visits (1-2 per month) by ecologists and site managers in lights good vehicles (LGVs) to monitor the progress of the rehabilitation plans.

Again, during this phase, despite the significant reduction in noise generating machinery the Applicant is committed to complying with all conditions, including noise, set out in IPC Licence, where applicable.

11.6 Likely Significant Effects and Associated Mitigation Measures

11.6.1 'Do-Nothing' Option

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the project not be carried out. As discussed in Section 3.2.1 in Chapter 3, the assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the Application Site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.2.1 in Chapter 3, peat extraction activities commenced at the Application Site in 1948 with the installation of drainage.

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

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

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Alternative land uses are discussed in Chapter 3 – Alternatives. Under this 'Do-Nothing' option, the IPC licence and associated ongoing decommissioning and planned rehabilitation would not have occurred.

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

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

However, consideration must be given to the following:

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

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

In the event that Substitute Consent is not granted in effect, the 'Do-Nothing' option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC licence requirements, Cutaway Bog Decommissioning and

Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

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

11.6.2 Identification and Description of Potential Impacts

11.6.2.1 Peat Extraction Phase (July 1988- June 2020)

11.6.2.1.1 *Peat extraction activities and all ancillary works*

A variety of items of machinery were in use for the purposes of peat extraction activities and all ancillary works. There were vehicular movements to and from the Application Site that made use of existing roads. Potential noise impacts are discussed in the following sections. It should be noted that peat extraction activities were seasonal, with peat extraction occurring during summer months when weather permitted. Potential noise impacts from machinery and equipment would have been experienced intermittingly during the active periods due to the continuous movement of machinery around the Application Site, i.e., no machinery operated continuously in the one location near sensitive receptors.

The approach below predicts noise levels at various distances to determine if significant effects are likely to have occurred.

As discussed in Section 11.3.4 the calculation methods in BS5228 are suitable for the calculation of noise levels at noise-sensitive locations near open sites such as the Application Site. The assessment begins with a set of machinery items that are considered typical for the activity of peat extraction which are listed below in Table 11-7.

Table 11-7 Representative Peat Extraction Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Dump Truck (C4.2)	78
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dewatering Pumps (D7.70)	80
Tractors (H.D, LHT, Ridger)	81
Rail Lifter	81
Locomotive and Wagons	81
Dragline/Shovel Excavator	81
Windrow Machine	81
Sod Moss Peat Collector	81
Milled Peat Harvester	81
Motor Cycles	81
Service Vehicles	81

Table 11-8 presents the operational noise levels for the Peat Extraction Phase at various distances from the activity. Again, due to the nature of the bog landscape it is assumed that the ground between the peat extraction activity and the noise-sensitive location is 'soft'; i.e., no acoustic screening was in place. The 'on-time' is assumed to by 80%, i.e., the machinery was operating for 80% of the working day. As a conservative measure, the calculations assume that all items of machinery listed in the table above operated at the same time at the stated distance from a noise-sensitive location, though this is unlikely to have been the case at all times.

Table 11-8 Typical Noise Emission Levels due to Peat Extraction

Phase	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	200m set back	250m set back	300m set back	350m set back
Peat Extraction	55	53	51	49

At distances of 200 m and beyond, the levels of noise are below the operational noise criterion of 55 dB $L_{Aeq,T}$ adopted in Section 11.3.4. Figure 11-3 shows the noise-sensitive locations with a coloured buffer of 200m around each one. Figure 11-4 shows highlighted yellow areas where the parts of the Application Site lie within 200m of a noise-sensitive location.

Any vibration generated by the machinery listed in Table 11-7 would be imperceptible at sensitive receptors at the distances listed above.

Figure 11-3 Noise-sensitive Locations with 200m buffers.

Figure 11-4 Areas, shown in yellow, where bog is within 200m of a noise-sensitive locations.

The diagrams show that only in a very limited number of locations at the Application Site, the peat extraction activity and all ancillary works had the potential to be within 200m of a noise-sensitive location. Beyond 200m, noise levels are within the criteria.

Vibration

During the Peat Extraction Phase, there were no significant vibration-generating sources operating on the Application Site. The vibration effects are neutral, imperceptible and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at the nearest noise sensitive locations associated with the Peat Extraction Phase are as described below. As the noise levels are below the criterion, the effect is considered not significant.

Quality	*Significance*	*Duration*
Negative	Not Significant	Long-term but limited to daytime and evenings and was seasonally dependant

11.6.2.1.2 *Additional Traffic on Public Roads*

In terms of the additional traffic on local roads that was generated as a result of peat extraction activities and all ancillary works, the following comment is presented: Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25%[1]. As demonstrated in Chapter 14 Material Assets, the volume of traffic generated by the Application Site for the 1988 to June 2020 period is estimated at 185,760 HGVs, leaving and returning to the Application Site over the 33-year period. This equates to an average of 22 HGV movements per day heading to different locations over a 252-day work-year. Personnel vehicles are estimated at 1,354,500 movements over the 33-year period which equates to 163 vehicles per day. Please see Chapter 14 Material Assets for details. It is considered that this additional traffic introduced onto the local road network did not result in a significant noise impact. The resultant noise impact was negative, not-significant and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at noise sensitive locations associated with the additional traffic generated during the Peat Extraction Phase are as described below.

Quality	*Significance*	*Duration*
Negative	Not-significant	Long-term

11.6.2.1.3 *Control Measures*

Prior to 2000, control measures pertaining to noise comprised of machinery maintenance:

1. *All peat harvesting machinery listed above in Section 4.2.2.3 were stored at the Ballivor Works at the end of the workday.*
2. *All machinery were regularly inspected, serviced.*
3. *Railway tracks and railway locomotives underwent continuous inspection and maintenance*

[1] *UK Design Manual for Roads and Bridges (DMRB, Volume 11, Section 3, Part 7)*

A discussed in Section 11.3.2, since April 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

Day-time: 55 dB(A)

Night-time: 45 dB(A).

Since 2000 there have been no breaches of noise limits by the onsite activities or noise complaints from noise sensitive locations in the vicinity of the site.

The following comments are taken from the Inspectors report for the licence application:[2]

> *No noise complaints have been received by the Agency with respect to operations associated with this application. The most dominant noise source associated with peat harvesting is rail movement while noise emissions also arise from the milling/harvesting operations. A baseline noise survey was conducted at two of the Bord na Móna Groups (Allen & Boora) and these were stated as being representative of noise emissions from all of the sites. The studies concluded that noise levels resulting from activities at the sites are unlikely to have any significant impact on the local environment. This was confirmed by noise monitoring undertaken during the peat harvesting season. The noise condition in the proposed determination will limit noise emissions from activities at the sites to daytime 55 L_{eq} dBA and night-time 45 L_{eq} dBA at noise sensitive locations.*

11.6.2.2 Current Phase (June 2020 – Present Day)

11.6.2.2.1 *Peat Removal and Rehabilitation*

During the Current Phase, the noise generating activities at the Application Site are much reduced with respect to the Peat Extraction Phase. The activity has been limited to removal of the former peat stockpiles from Bracklin and Ballivor bogs; the stockpiled peat was transported to Ballivor Works via internal rail, where it was taken via tipper trucks for loading onto lorries and transported from Ballivor Works to its end destination. Other elements of the Current Phase are the environmental and ecological monitoring and some rehabilitation works, neither of which generate significant noise.

Similar to the Peat Extraction Phase, the approach taken predicts noise levels at various distances, to evaluate as to whether any significant effect is occurring or likely to have occurred. The machinery involved in peat removal are listed in Table 11-9.

Table 11-9 Representative Peat Removal and Rehabilitation Machinery and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Dozer (C2.13)	78
Dump Truck (C4.2)	78

[2] https://epawebapp.epa.ie/licences/lic_eDMS/090151b280043529.pdf, *From Licence application Reg 501, page, 4, 1999*

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Rehabilitation: Plough	81

Table 11-10. presents the noise levels for the Current Phase at various distances from the activity. Again, it is assumed that the ground between the Current Phase activity of peat removal and the noise-sensitive location is 'soft'. No acoustic screening is in place.

Table 11-10 Typical Noise Emission Levels due to Peat Removal

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	150	200	250	300
Peat Removal and Rehabilitation Machinery	53	49	47	45

As there are fewer noise sources in the Current Phase than in the Peat Extraction Phase, less noise is generated and the distances at which the criteria would be exceeded is less: at distances of 150 m and beyond, the levels of noise are below the operational noise criterion of 55 dB $L_{Aeq,T}$. Similar to the Peat Extraction Phase, the number of noise-sensitive locations within 150m is limited.

Vibration

During the Current Phase, there are no significant vibration-generating sources operating at the Application Site. The vibration effects are neutral, imperceptible and short-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects associated with the current phase at the nearest noise sensitive are described below.

Quality	*Significance*	*Duration*
Negative	Not Significant	Short-term

11.6.2.2.2 *Control Measures*

The assessment in Section 11.6.2.2.1 above has found that there are no significant noise impacts. However, as stated in Section 11.6.2.1.3, since April 2000 the Application Site has been operating under an IPC Licence which imposes the following noise limits:

- *Day-time: 55 dB(A)*
- *Night-time: 45 dB(A).*

11.6.2.3 Remedial Phase

11.6.2.3.1 *Rehabilitation Works*

The main activity associated with the Remedial Phase comprises the blocking of drains across all bogs and involves a limited amount of machinery, as listed in Table 11-11. The blocking is expected to occur in year 1 and 2. During this phase, ecologists and site managers will oversee the works and therefore, personnel vehicles will travel to and from the site daily. From year 3 onwards, just monthly site visits by ecologists and site managers will occur to monitor the success of the rehabilitation.

Table 11-11 Machinery for the Remedial Phase and Associated Noise Levels

Item (BS 5228 Ref.)	Source Noise level at 10m Distance (dB $L_{Aeq,T}$)
Track Excavator (C2 22)	72
Tractor (n/a)	81

Table 11-12 presents the operational noise levels for the Remedial Phase at various distances from the activity.

Table 11-12 Representative Noise Emission Levels due to Remedial Phase year 1 and 2 only

Item	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,T}$)			
	80	100	125	150
Rehabilitation Machinery	55	53	51	49

Similarly, as the number of noise-generating items required is less than those associated with the Peat Extraction Phase, the distances at which the criteria would be exceeded are further reduced; at distances of 80 m and beyond, the levels of noise are all below the operational noise criterion of 55 dB $L_{Aeq,T}$. Similar to the Current Phase, the number of noise-sensitive locations within 80m is limited.

Vibration

During the Remedial Phase, there will be no significant vibration-generating sources operating on the Application Site. The vibration effects are neutral, imperceptible and long-term.

Description of Effects

In accordance with EPA criteria for description of effects, the potential effects at the nearest noise sensitive associated with the Remedial Phase are described below.

Quality	*Significance*	*Duration*
Neutral	Imperceptible	Long-term

11.6.2.3.2 *Mitigation Measures*

The Applicant will continue to comply with the conditions relating to noise set out in the IPC Licence as applicable.

11.6.3 Residual Effects

11.6.3.1 Peat Extraction Phase (July 1988- June 2020)

The Noise Impact Assessment has concluded that noise emissions and vibration generated during the Peat Extraction Phase were not significant. The noise emissions associated with the current on-site activities and the future rehabilitation works are considered less than the past peat extraction activities and all ancillary works and therefore potential of residual effects associated with the Peat Extraction Phase are considered long term negative but not significant. In respect of noise and vibration from additional traffic on public roads due to activity on site, the effects at the nearest noise sensitive were also long term negative but not significant.

11.6.3.2 Current Phase (June 2020 – Present Day)

The potential effects at the nearest NSLs associated with the Current Phase activities are described as negative, not significant and short-term.

11.6.3.3 Remedial Phase

The potential effects at the nearest NSLs associated with the remedial measures phase activities are described as neutral, imperceptible, and long-term.

11.6.4 Significance of Effects

11.6.4.1 Peat Extraction Phase (July 1988- June 2020)

The effects at the nearest NSLs associated with the Peat Extraction Phase are described as not significant.

11.6.4.2 Current Phase (June 2020 – Present Day)

The effects at the nearest NSLs associated with the Current Phase are described as not significant.

11.6.4.3 Remedial Phase

The effects at the nearest NSLs associated with the Remedial Phase are described as imperceptible.

11.6.5 Cumulative and In-Combination Effects

11.6.5.1 Peat Extraction Phase (July 1988- June 2020)

Chapter 4 describes in detail the peat extraction activity from 1948 until 1988. There is no temporal overlap between peat extraction during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural

activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Peat Extraction Phase, there is no potential for cumulative effects with typical rural background noise-generating activities.

11.6.5.2 Current Phase (June 2020 – Present Day)

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Current Phase, there is no potential for cumulative effects with typical rural background noise-generating activities.

11.6.5.3 Remedial Phase and Overall Cumulative Effect

Chapter 4 describes in detail the peat extraction activity from 1948 until 1988. There is no temporal overlap between peat extraction during this period and the period under assessment (1988 to 2020). Therefore, there is no potential for cumulative effects.

Section 2.5 of Chapter 2 lists all the relevant plans and projects for cumulative impact consideration. The list comprises one-off houses, small scale commercial forestry, private turbary and agricultural activities which are typical of a rural background noise baseline. As the above assessment concluded there are no significant effects from the Project, there is no potential for cumulative effects with typical rural background noise-generating activities.

The proposed Ballivor Wind Farm (ABP Ref. PA25M.316212) is subject to a separate EIAR and contains an assessment of noise from the construction, operation and decommissioning phase of wind farm in accordance with best practice. As wind turbine noise varies with wind speed at any time, a specific noise assessment methodology is used which takes account of the variability of noise levels over the operating wind speed range. Wind turbine noise at noise-sensitive locations is described in terms of the L_{A90}, parameter which is the level which is exceeded for 90% of the measurement period. It will therefore exclude the effects of brief, intermittent events and is used to estimate a background level.

Noise from the machinery associated with the Remedial Phase (years 1 and 2) is not dependent on the wind speed and is therefore assessed differently, i.e. calculating the external noise level at the façade of noise-sensitive locations. These noise levels are then compared to criteria as discussed in Section **Error! Reference source not found.**, in terms of the L_{Aeq} parameter, which is the equivalent continuous sound level. Each assessment method is robust and appropriate to the noise source in each case.

If the proposed Ballivor Wind Farm is consented, it is extremely unlikely the drain blocking activities of the Remedial Phase will occur concurrently to the operation of the wind farm. The drain blocking will be done either in advance of any wind farm construction or post construction. However, in the unlikely event they occurred at the same time, the noise criteria for the Remedial Phase (day-time) activities are 55 dB L_{Aeq} (defined in Section 11.3.2). Therefore, based on the below limits for the wind farm, it is considered that there is no significant potential for cumulative effects should the two events run concurrently.

The proposed operational limits in $L_{A90,10min}$ for Ballivor Wind Farm will be, at the facades of noise-sensitive locations:

- 40 dB $L_{A90,10min}$ for quiet daytime environments of less than 30 dB $L_{A90,10min}$;
- 45 dB $L_{A90,10min}$ for daytime environments greater than 30 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher), and;
- 43 dB $L_{A90,10min}$ or a maximum increase of 5 dB above background noise (whichever is higher) for night-time periods.

The consented Bracklyn Wind Farm (ABP Ref. PA25M.311565) development comprising 9 turbines and ancillary infrastructure is located immediately adjacent to the Application Site boundary. The Bracklyn Wind Farm EIAR has demonstrated that there are no significant cumulative effects with the proposed Ballivor Wind Farm. As such, there is no potential for cumulative effects with the Ballivor Wind Farm and Remedial Phase activities.

11.7 Conclusion

This chapter of the rEIAR has assessed the potential for any likely significant effects of noise and vibration due to past activities at Ballivor Bog. Noise and vibration impacts have been identified, described and then assessed as 'not significant' for the Peat Extraction Phase and the Current Phase, and as 'imperceptible' for the Remedial Phase.

In respect of vibration none of the three phases included or will include any significant vibration-generating sources operating on the Application Site.

The assessment of potential cumulative effects of the Remedial Measures phase and the proposed Ballivor wind farm, along with the consented Bracklyn wind farm, has concluded that is no potential for cumulative effects with the wind energy developments.