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11. NOISE AND VIBRATION

11.1 INTRODUCTION

This chapter reports the findings of an assessment of any likely significant noise and vibration effects occurring as a result of Bord na Móna peat extraction and ancillary activities at Derryhinch, Drumman, Derryarkin and Ballybeg and Toar Bogs (the Application Site). The assessment considers the Peat Extraction Phase (from 1988 – June 2020), the Current Phase (June 2020 – present day), and Remedial Phase (future rehabilitation activities).

Noise impact assessments have been undertaken for the Peat Extraction Phase, the Current Phase and the Remedial Phase of the Application Site at the nearest noise-sensitive locations (NSLs). 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 and related activities.

Chapter 4 (Project Description) provides a full description of the Project and describes the peat extraction activities that took place between 1950 (when peat extraction commenced), activities undertaken during the Peat Extraction Phase (1988 – June 2020), subsequent decommissioning and maintenance activities undertaken during the Current Phase, and the rehabilitation measures proposed as part of the Remedial Phase.

The Bord na Móna Annual Environmental Reports (available from 2000 onwards) have been reviewed and no environmental noise complaints were reported. Noise monitoring was not carried out during this period as it was not required by the IPC Licence associated with the site.

It should also be noted that environmental noise effects are generally temporary in nature. Once the noise-generating activity ceases, the associated environmental noise effects cease immediately. As a result, environmental noise does not give rise to residual effects that persist following the cessation of the activity concerned.

As discussed in Chapter 1, historical impacts associated with the Peat Extraction Phase have been assessed from 1988 (the latest date for the transposition of the EIA Directive into Irish law), to present day. Accordingly, this application for Substitute Consent is confined to the development which took place after those dates. The baseline against which the environmental effects of the development required to be assessed has therefore, been identified as being the position as of July 1988.

11.1.1 Statement of Authority

This chapter of the remedial EIAR was prepared by Alex Clark (Senior Acoustic Consultant) who holds a BEng in Acoustical Engineering and is a member of the Institute of Acoustics (MIOA). Alex has worked in the field of acoustics for over 9 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, industrial, commercial and residential.

This chapter of the remedial EIAR was reviewed by Damian Kelly of Awn Consulting who holds a BSc in Analytical Science and MSc in Environmental Science and is a member of the Institute of Acoustics (MIOA). The consultant has worked in the field of acoustics for 30 years and has

extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, wind energy, industrial, commercial and residential as well as working on substitute consent sites in the past.

Donogh Casey (Acoustic Technician) carried out the baseline noise survey in 2026, presented in section 11.4. He has been working in the field of acoustics since 2018 and has extensive experience in both building acoustic commissioning and environmental surveying. He is currently a member of the Sound Insulation Testing Register, Ireland (SITRI). He is currently studying for the Institute of Acoustics Diploma in Acoustics and Noise Control.

11.2 ASSESSMENT METHODOLOGY

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, Current 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 peat extraction phase 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 and related activities at the Application Site.

11.2.1 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 Sound Pressure Levels (SPL) is 0 dB (for the threshold of hearing) to 120 dB (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 10 dB 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 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 250 Hz. 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. SPL's 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.

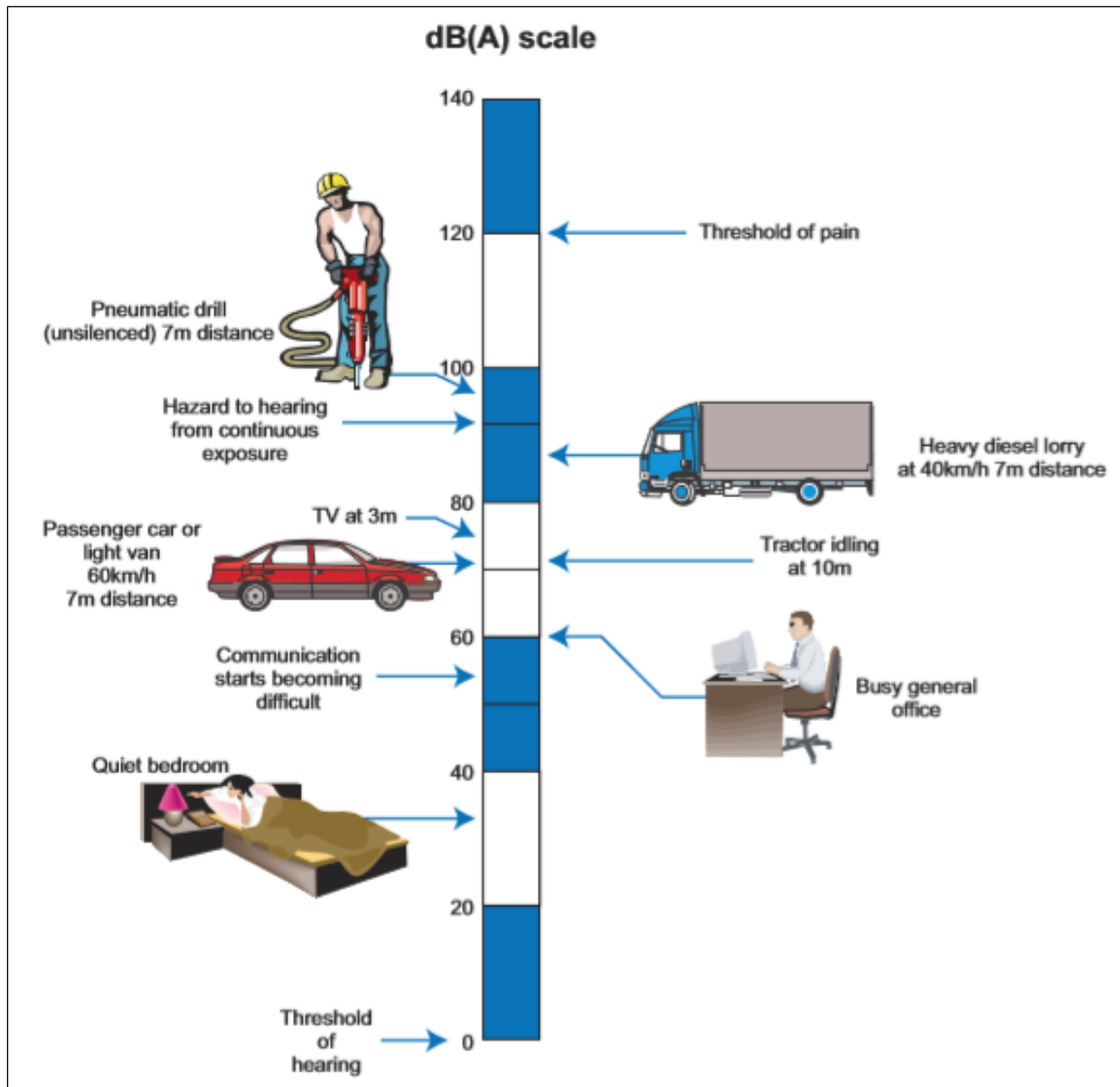


Figure 11-1 The level of typical common sounds on the dB(A) scale (NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004)

For a glossary of terms used in this chapter please refer to Appendix 11.1.

11.2.2 Guidance Documents and Assessment Criteria

The following sections review best practice guidance that are considered appropriate to peat extraction works.

While machinery associated with peatland drainage and site development was first used at the Application Site in the 1950s the assessment of historic operations has been undertaken with reference to the noise limits specified in the current Integrated Pollution Control (IPC) Licence (Reg. No. P0501-01), which was granted in April 2000.

For the purposes of this assessment, noise levels at representative noise-sensitive locations arising from machinery and activities associated with peat extraction operations have been

calculated and compared against the noise criteria contained within the current IPC Licence. Where predicted noise levels comply with these criteria, it is considered that the historic operation of the site would not have resulted in significant adverse noise effects.

Accordingly, the assessment adopts a conservative approach by applying the current IPC Licence noise limits to historic peat extraction activities, including those undertaken prior to the grant of the licence in April 2000. This provides a consistent benchmark against which the potential noise effects of historic operations can be evaluated.

11.2.2.1 Noise

Condition 8 of the IPC Licence Reg. (No. P0501-01) issued to Bord na Móna Energy Ltd sets out the limits on noise levels within the Derrygreenagh Bog Group, including the Application Site. The Condition states that Bord na Móna is subject to the following limits on noise levels.

“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 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 of the licence is as follows:

“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).”

The IPC licence therefore placed limits on site noise at NSLs but did not require that noise monitoring be carried out.

As activity on site has historically been, and will continue to be, carried out during daytime hours only (daytime is considered to be between the hours of 07:00 and 23:00), the relevant noise level limit is 55 dB $L_{Aeq,30min}$ at noise-sensitive locations. This noise criterion is considered to apply to the Peat Extraction Phase, Current Phase and Remedial Phase.

Noise-sensitive locations in this context are defined as any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels. In this instance, all of the NSLs are dwellings.

11.2.2.2 Vibration

Reference is made to BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting (BSI 2008) which provides the following Vibration Dose Value (VDV) ranges which result in various probabilities of adverse comment resulting from exposure to vibration within residential buildings, these being the most sensitive building use type. An adverse comment is an unfavourable human reaction or response.

Table 11.1 BS 6472 VDV ($\text{m}\cdot\text{s}^{-1.75}$) above which various degree of adverse comment may be expected in residential buildings

Building Type	Low probability of adverse comment (1)	Adverse comment possible ($\text{m}\cdot\text{s}^{-1.75}$)	Adverse comment probable ($\text{m}\cdot\text{s}^{-1.75}$) (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.

11.2.2.3 Additional Traffic on Public Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the Project made use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that arose because of vehicular movements associated with the development.

In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 11.2, taken from Design Manual for Roads and Bridges (DMRB), LA 111 Noise and vibration Revision 2 (UK Highways Agency et al, 2020) offers guidance as to the likely degree of impact associated with any long-term change in traffic noise level.

Table 11.2 Significance in Change of Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact	EPA Significance of Effect
0	Inaudible	Negligible	Imperceptible
0.1 – 2.9	Barely Perceptible		Not Significant
3 – 4.9	Perceptible	Minor	Not Significant to Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Slight to Moderate
10+	Doubling of loudness and above	Major	Significant to Very significant

The guidance outlined in Table 11.2 will be used to assess the increases in traffic levels on public roads that arose from activities at the Application Site and comment on the likely long-term impacts during the operational phase.

11.2.3 Study Area

The noise sensitive receptors surrounding the Application Site have been considered for the purposes of this assessment.

11.2.4 Field Surveys

As a means of characterising the receiving environment, reference is made to the noise surveys carried out in 1999 at various other bogs in the general area in support of the IPC Licence application for peat extraction at the bogs.

The background noise measurement locations are considered to be suitably representative of the noise sensitive receptors around the Application Site for the purposes of this assessment, due to the nature of the environment, the surroundings, and distance to key transport sources.

In addition, no other noise data is available that relates to the Peat Extraction Phase (i.e. 1988 - 2020) that would be considered more representative of the nearby noise sensitive receptor locations for that period.

A summary of the noise measurements is provided in Section 11.3.

11.2.5 Noise Calculations

British Standard 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1 Noise* is appropriate for open sites such as those in question here. The standard contains a calculation method for noise propagation from plant 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.

11.3 ESTABLISHING THE 1988 BASELINE CONDITIONS

Reference is made to the background and operational noise surveys carried out in the preparation of the Allen Bog Group IPC Licence application prepared by Bord na Móna Allen Peat Limited (IPC Ref. P0503-01).

11.3.1 Field Surveys

11.3.1.1 Measurement Locations

A noise survey was carried out in 1999 in support of the Allen Bog Group IPC Licence application.

The background noise measurement locations were at the Ballykeane, Killinagh, Esker and Pollagh bogs. Figure 11-2 below shows the locations of the measurements in relation to the Application Site boundary, along with an additional noise measurement location (N10) from a survey carried out in 2026, discussed in Section 11.4.

Coordinates for the 1999 noise monitoring locations are detailed in Table 11.3.

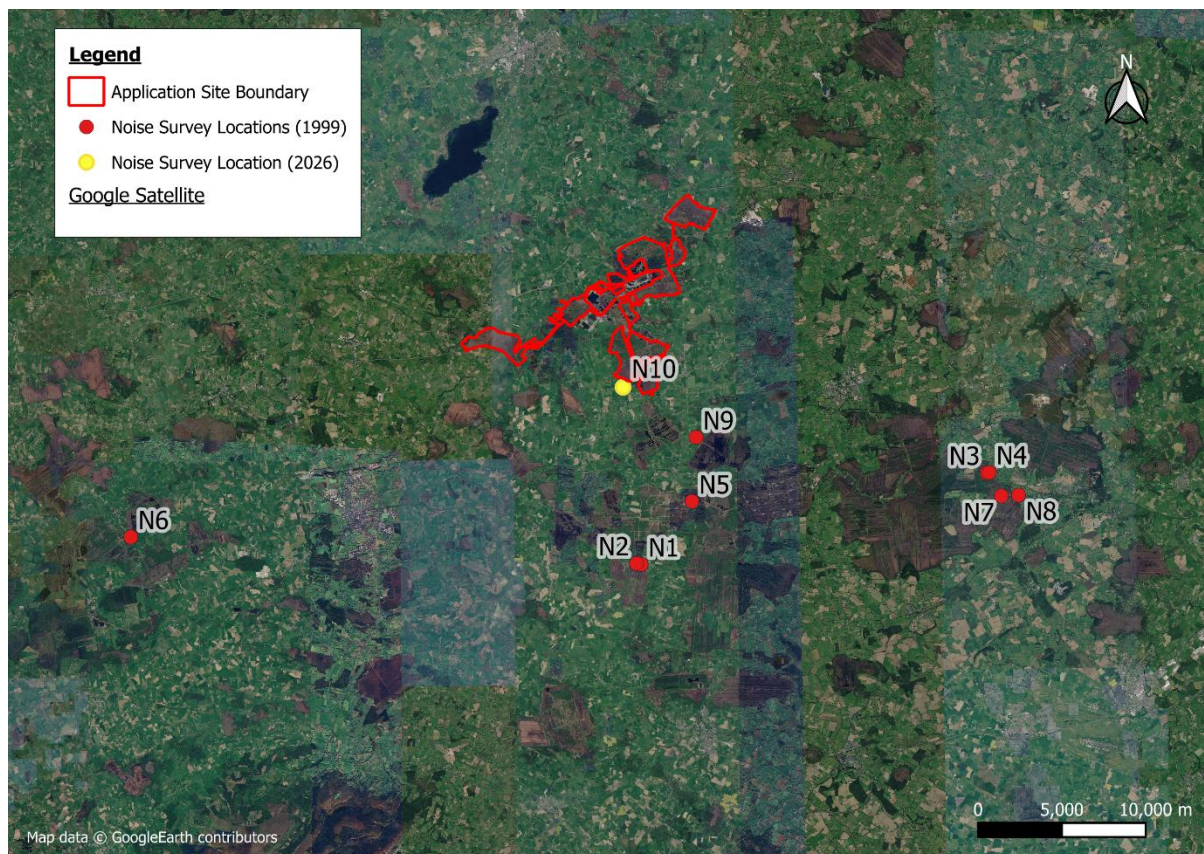


Figure 11-2: Noise Measurement Locations N1-N9 (1999) and N10 (2026)

Table 11.3 Measurement Location Coordinates 1999

Location	Bog	Coordinates – Irish Transverse Mercator (ITM)	
		Easting	Northing
N1	Ballykeane	650600	722199
N2	Ballykeane	650330	722254
N3	Killinagh	671235	727653
N4	Killinagh	671365	727678
N5	Ballycon Workshop	653639	725953
N6	Pollagh	620171	723829
N7	Killinagh	672085	726278
N8	Killinagh	673115	726328
N9	Esker/Cavemount	653879	729778

11.3.1.2 Measured Noise Levels 1999

Measured noise levels are summarised in Table 11.4. Although not measured at the Application Site, the noise levels are representative of the rural environment which surrounds the Application Site. The majority of background noise levels were in the range 30 to 40 dB L_{A90} .

Table 11.4 Measured Noise Levels from 1999 Survey

Location	Comment	Measured Noise Level Range, dB	
		$L_{Aeq,5min}$	$L_{A90,5min}$
N1	Background	37-41	32-35
N2	Background	46-57	33
N1	Operations	61	41-42
N2	Operations	45-51	33-40
N1	Night-time	32	31
N2	Night-time	57-59	31
N3	Background daytime	43	38
N4	Background daytime	42	35
N4	Night-time	32	31
N5	Background	51	43
N6	Background	59	48
N5	Rail Movements	77	47
N6	Rail Movements	62-65	48-55
N6	Background	62	30
N6	Rail Movements (Night-time)	71-73	45-59
N7	Background	56	43
N7	Operations	62	52
N9	Night-time	56	30
N9	Rail Movements (Night-time)	80	43

11.4 2026 NOISE SURVEY

In addition to the Allen Bog Group 1999 noise survey, an additional survey was carried out in 2026 in preparation of an application for Derrygreenagh Wind and Solar Project, which is currently in the design phase.

A representative noise survey location was selected, which in accordance with the noise survey guidance for wind farm assessments, was located at sufficient distance from any existing wind turbines in the area to not be significantly affected by their noise. The location is shown as 'N10' on Figure 11-2 above.

Table 11.5 Measurement Location Coordinates 2026

Location	Coordinates – Irish Transverse Mercator (ITM)	
	Easting	Northing
N10	649526	732763

11.4.1.1 Measured Noise Levels 2026

Measured noise levels are summarised in Table 11.6. Any data containing rain, or wind above 4 m/s has been excluded from the analysis. The noise levels are representative of the rural environment which surrounds the Application Site.

Table 11.6 Measured Noise Levels from 2026 Survey

Location	Comment	Measured Noise Level Summary, dB	
		L _{Aeq,10min}	L _{A90,10min}
N10	Day (07:00-23:00)	55	28
	Night (23:00-07:00)	47	18

11.5 PROJECT DESCRIPTION

For a detailed description of the Peat Extraction Phase, the Current Phase and Remedial Phase and the Potential Future Land Use, please refer to Chapter 4 Project Description of this remedial EIAR. The below outlines the noise-emitting specific elements each phase.

11.5.1 Peat Extraction Phase 1988 – 2020

By 1988, the land use at the Application Site was well established as industrial peat extraction.

The annual breakdown of primary activities associated with the Peat Extraction Phase are outlined in Table 11.7.

Table 11.7 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/protection/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 4.4.2, 4.4.4, 4.4.5 and 4.4.7 in Chapter 4 of this remedial EIAR 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)
 - Sod Moss Peat Collector
 - Milled Peat Harvester
- Dump Truck
- Track Excavator;
- Dewatering Pumps;
- Rail Lifter;
- Locomotive and Wagons, and;
- Service Vehicles.

In addition to these machines, peat which had been extracted at the Application Site was transported primarily to Croghan Briquette Factory and Rhode Power Station by private rail until their closure in 2000 and 2003 respectively. Once these were decommissioned, end users then included: Ballivor Horticultural Works, Derrinlough Briquette Factory, Lough Ree Power Station, West Offaly Power Station, Cúil na Móna Horticultural Works, Edenderry Power Station, and other third-party horticultural peat customers with a mixture of private railways and HGVs, however this tended towards less rail and more HGV use over time.

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

As discussed in Section 11.2.2.1, from 2000 onwards, the Application Site has operated under IPC Licence P0501-01.

As activities on the Application Site have been carried out in daytime hours only, the relevant noise level limit is 55 dB $L_{Aeq,30min}$ 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 (June 2020 to Present Day)

In January 2021, the Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction at the Application Site had ceased prior to this in June 2020. The Application Site still operates under the requirements of IPC Licence P0501-01.

Between 2020 and 2021, remaining stockpiled peat was systematically removed from the Application Site and transferred to various end users, including:

- Ballivor Horticultural Works
- Derrinlough Briquette Factory
- Lough Ree Power Station
- West Offaly Power Station
- Cúil na Móna Horticultural Works
- Edenderry Power Station
- Other third-party horticultural peat customers

Future activities at the Application Site will principally comprise:

- Environmental monitoring;
- Decommissioning works, and;
- Ongoing site management activities associated with the Remedial Phase.

During the decommissioning phase, activities will principally comprise the removal or decommissioning of remaining peat extraction infrastructure including rail infrastructure, buildings, compounds, fuel tanks, septic tanks, pumps, waste materials and other ancillary facilities, together with associated environmental management and monitoring activities.

Due to decreased levels of activity and the corresponding reduced employee numbers at the Application Site during the Current Phase, any railway or vehicle 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 4.8 in Chapter 4 of this remedial EIAR, and are summarised listed below:

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

Section 11.6.2 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's 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 including improvements in the local landscape, contributing to the reduction in 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 Bog Decommissioning and 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.

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 light good vehicles (LGVs) to monitor the progress of the rehabilitation plans.

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

11.6 ASSESSMENT OF SIGNIFICANT NOISE AND VIBRATION EFFECTS

11.6.1 Do-Nothing Scenario

As stated in Chapter 3 Section 3.4.1 "The 'Do-Nothing' option is defined as the Project (as described in Section 4.3 of Chapter 4) having ceased at the Application Site in 1988."

"Under the 'Do-Nothing' option, IPC Licence Ref. P0501-01 would not have been granted by the EPA in 2000 and associated decommissioning and rehabilitation would not occur as required under that Licence."

From 1988, in the Do-Nothing Scenario, it is therefore assumed that the peat extraction and associated works ceased and that the bog lands were allowed to naturally revegetate with scrub and bog woodland more widespread across the site as is evident from areas of the Application Site which have been out of production for long periods of time.

Therefore, where peat extraction activities ceased at the Application Site in 1988, there would have been no subsequent noise emissions arising from peat extraction operations at that location. Consequently, no noise or vibration effects associated with peat extraction would have occurred beyond the cessation of those activities.

11.6.2 Peat Extraction Phase 1988 – 2020 (Drainage, Peat Extraction & Associated Activities)

A variety of items of plant and machinery were in use for the purposes of peat extraction and ancillary activities, and these are described in Chapter 4. There were also vehicular movements to and from the site bogs that made use of existing roads. Potential noise impacts are discussed in the following sections.

The approach here will be to predict noise levels at various distances from the vehicle routes, to demonstrate that no significant effect is likely to have occurred.

As introduced in Section 11.2.5, the calculation methods in BS5228 are suitable for the calculation of noise levels at noise-sensitive locations due to the peat extraction. The assessment begins with a set of plant items that are considered typical for the activity of peat extraction. Noise levels for items not covered in BS5228 are assumed to have a sound pressure level of 81 dB(A) at 10 m.

Table 11.8 Typical Peat Extraction Plant and Associated Noise Levels

Item (BS 5228 Ref.)	Plant Noise level at 10 m Distance (dB L _{Aeq,T})
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Tracked Excavator Lorry (D3 44)	81
Dozer (C2.13)	78
Dump Truck (C4.2)	78
Tractor	81
Rail Lifter	81
Locomotive and Wagons	81
Miller	81
Harrow	81
Ridger	81
Harvester	81
Service Vehicles	81

Table 11.9 presents the total predicted operational noise levels at various distances from the activity. The values take account of the soft nature of the ground. No acoustic screening was in place. The 'on-time' is assumed to be 80% as a worst-case scenario, i.e. the machinery was operating for 80% of the working day, but in practice it was actually less. As a conservative measure, the calculations assume that all items of machinery listed in the table above were operating 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 11.9 Typical Noise Levels due to Peat Extraction

Phase (dB $L_{Aeq,T}$)	Total Predicted Operational Noise Level at Stated Distance (m) from Edge of Works			
	200	250	300	350
Peat Extraction	55	53	51	50

At distances of 200 m and beyond, the levels of peat extraction noise are all within the operational noise criterion of 55 dB $L_{Aeq,T}$ adopted in Section 11.2.2.

Figure 11-3 shows the noise-sensitive locations with a coloured buffer of 200 m around each one.

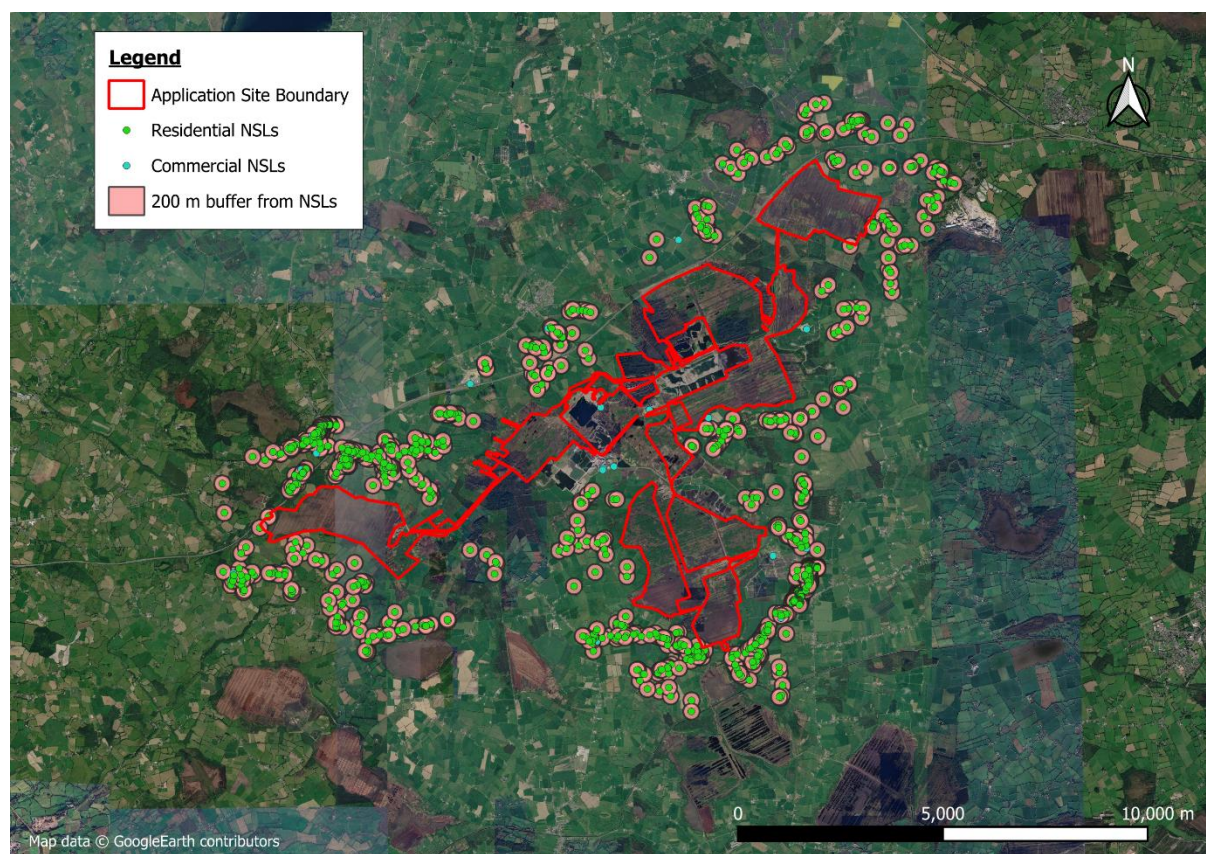


Figure 11-3: Noise-sensitive locations with 200 m buffers

In the following figures, areas within the Application Site boundary which are within 200 m of a residential noise-sensitive-location are displayed. The figures show that only in a very limited

number of areas, the peat extraction activity had the potential to be within 200 m of a residential noise-sensitive location. Beyond these 200 m buffers, i.e. within the vast majority of the site, noise levels due to peat extraction activity were below the criteria at residential noise-sensitive locations and therefore in compliance with the noise level limits stated in the IPC Licence.

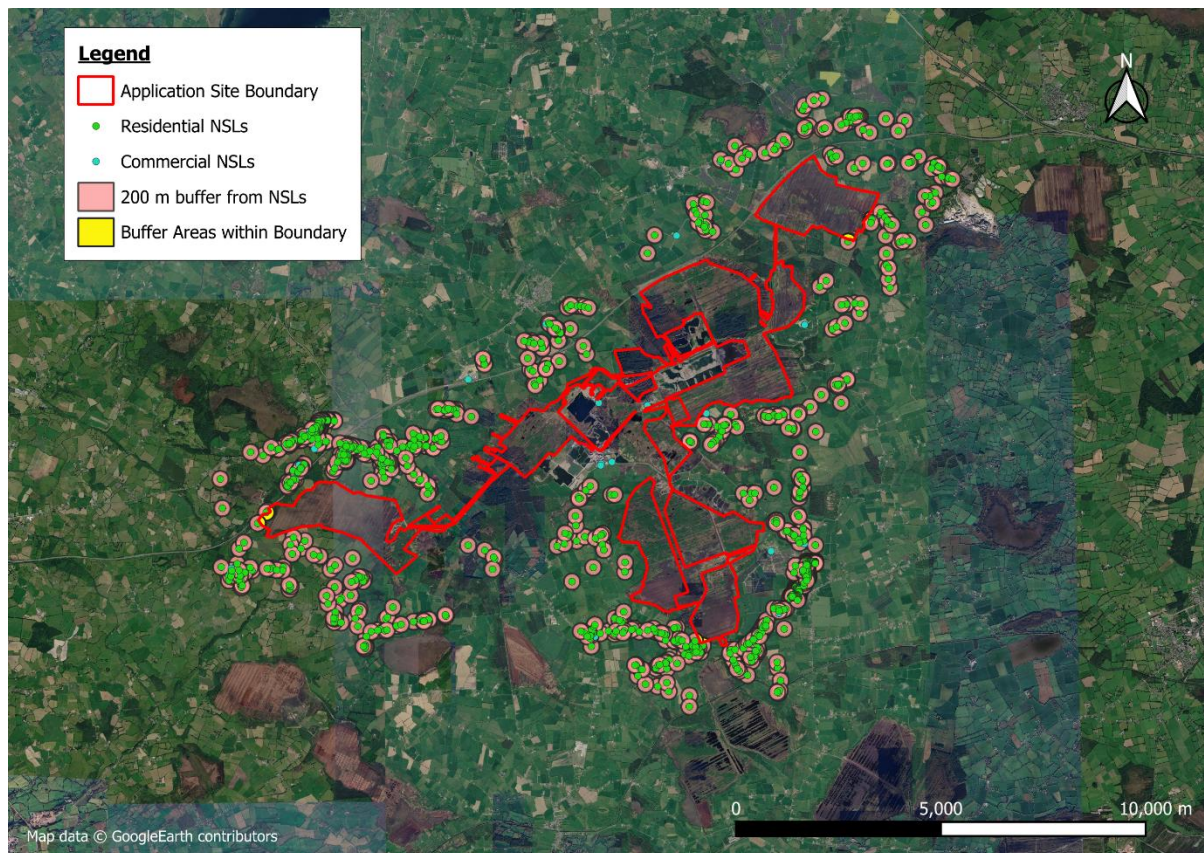


Figure 11-4: Areas, shown in yellow, where bog is within 200m of NSLs.

With respect to the EPA criteria for description of effects, the potential effects at the nearest noise-sensitive associated with the Peat Extraction Phase are described as **negative, not significant and long-term**.

11.6.2.1 Additional Traffic on Public Roads

During the Peat Extraction Phase (1988-2020), peat from the Application Site was transported using a combination of Bord na Móna's internal industrial rail network and HGVs on the public road network. Chapter 14 Traffic, states that the destinations for the transported peat includes power stations, briquette factories and horticultural facilities. The extensive rail network connected the bog units to facilities such as Rhode Power Station, Croghan Briquette Factory and Derrygreenagh Works, reducing reliance on road transport, although road-based haulage became more prevalent during the later years of extraction. Additionally, traffic on local roads was also generated as a result of staff movements in private vehicles to and from the Application Site.

Quantified road traffic associated with the site comprised approximately 154 vehicle movements per day, of which 150 movements were staff traffic and approximately 4

movements were HGVs. As per Table 14-8 of Chapter 14, this corresponds to an increase of traffic on public roads between 0.7% and 7.5%, depending on the specific road.

In order to increase traffic noise levels by 1 dB relative traffic volumes would need to increase by the order of 25%, assuming a similar HGV and LGV percentage. According to Table 11.2, a 1 dB increase in traffic noise level results in a change in noise level which is not significant.

Based on an increase of up to 7.5%, it is considered that the effects at noise-sensitive locations of site traffic during the Peat Extraction Phase were therefore **neutral, not significant and long-term**.

11.6.2.2 Vibration

Criteria for vibration at NSLs have been presented in Section 11.2.2.2 in terms of a vibration parameter Vibration Dose Value (VDV). No vibration measurements are available from the peat extraction phase.

For context relating to the wider area, vibration measurements carried out by AWN Consulting, for an unrelated project, at a distance of 15 m from the main Dublin to Limerick/Cork train line yielded a VDV value of $0.02 \text{ m}\cdot\text{s}^{-1.75}$. With reference to Table 11.1, this value is well below the criteria for adverse comment, even during night-time periods. Considering that the much lower speeds of the locomotives and wagons in use during the Peat Extraction Phase, it is not considered that a significant vibration effect occurred. The resultant vibration impact was **negative, not significant and long-term**.

11.6.3 Current Phase (June 2020 to Present Day)

Peat extraction ceased in June 2020. Decommissioning is underway across the Application Site including the removal of rail tracks, diesel storage tanks, septic tanks and removal of stockpiles from site. Stockpiled peat was moved to end-users by rail from the cessation of peat extraction until 2021, with the remaining stockpiles being transported via HGV deliveries using the internal rail and public road network. Vehicular traffic also arose from the movement of personnel to and from the Application Site during working hours. Full details of the process are presented in Section 4.8.1 of Chapter 4.

Similar to the Peat Extraction Phase, to the assessment predicts noise levels at various distances, to demonstrate that no significant effect has occurred or is likely to occur in the future. The set of plant items involved in the removal of the infrastructure associated with peat extraction operations are listed in Table 11.10 along with associated noise levels.

Table 11.10 Typical Decommissioning Plant and Associated Noise Levels

Item (BS 5228 Ref.)	Plant Noise level at 10m Distance (dB L _{Aeq,T})
Wheeled Loader Lorry (C2 28)	74
Track Excavator (C2 22)	72
Tracked Excavator Lorry (D3 44)	81
Dozer (C2.13)	78

Item (BS 5228 Ref.)	Plant Noise level at 10m Distance (dB L _{Aeq,T})
Dump Truck (C4.2)	78
Tractor	81
Locomotive and Wagons	81
Rail Lifter	81
Service Vehicles	81

Table 11.11 presents the total predicted operational noise levels at various distances from the activity. Similarly, the values take account of the soft nature of the ground. No acoustic screening is in place. The 'on-time' is assumed to be 80%, i.e. the machinery was/is operating for 80% of the working period. As a conservative measure, the calculations assume that all items of machinery listed in the table above operate at the same time at the stated distance from a noise-sensitive location, though this is unlikely to have been the case.

Table 11.11 Typical Noise Levels during Decommissioning

Phase (dB L _{Aeq,T})	Total Predicted Operational Noise Level at Stated Distance (m) from Edge of Works			
	160	250	300	350
Current Phase	55	51	49	48

In this instance, at distances of 160 m and beyond, the predicted levels of noise are all below the operational noise criterion of 55 dB L_{Aeq,T} adopted in Section 11.2.2.

With reference to Figure 11-4, showing 200 m buffer zones, a similarly small area of the site lies within 160 m of a noise-sensitive location. Beyond 160 m noise levels are within the required criteria as stated in Section 11.2.2.1, and therefore compliant with the noise levels stated in the IPC Licence.

With respect to the EPA criteria for description of effects, the potential effects at the nearest noise-sensitive location associated with the Current Phase are described as **negative, not significant and short-term**.

11.6.3.1 Additional Traffic on Public Roads

During the Current Phase (June 2020-present), traffic was primarily associated with decommissioning, environmental monitoring, site management and stockpiled peat removal from Ballybeg Bog during 2020-2021.

Quantified traffic reduced to approximately 42 vehicle movements per day (40 staff and 1.7 HGV movements), reflecting a substantial decrease compared to the Peat Extraction Phase. Additionally, traffic on local roads was also generated as a result of staff movements in private vehicles to and from the Application Site. As per Table 14-10 of Chapter 14, this corresponds to an increase of traffic on public roads between 0.19% and 2%, depending on the specific road.

In order to increase traffic noise levels by 1 dB relative traffic volumes would need to increase by the order of 25%, assuming a similar HGV and LGV percentage. According to Table 11.2, a 1 dB increase in traffic noise level results in a change in noise level which is not significant.

Based on an increase of up to 2%, it is considered that the effects at noise-sensitive locations of site traffic during the Peat Extraction Phase were therefore **neutral, not significant and long-term**.

11.6.3.2 Vibration

Criteria for vibration at NSLs have been presented in Section 11.2.2.2 in terms of a vibration parameter Vibration Dose Value (VDV). No vibration measurements are available from current phase.

For wider site context relating to vibration effects, vibration measurements were carried out by AWN Consulting, for an unrelated project, at a distance of 15 m from the main Dublin to Limerick/Cork train line yielded a VDV value of $0.02 \text{ m}\cdot\text{s}^{-1.75}$. With reference to Table 11.1, this value is well below the criteria for adverse comment, even during night-time periods. Considering that the much lower speeds of the locomotives and wagons in use during the Current Phase, it is not considered that a significant vibration effect occurred. The resultant vibration impact was **negative, not significant and long-term**.

11.6.4 Remedial Phase (Future)

The main activities for the rehabilitation works will include the blocking of drains in the bog in general and the ploughing of gravel slopes. Predicted noise levels are likely to be lower than those predicted for the decommissioning phase as works will be localised and short-term. No significant noise effects are likely at noise-sensitive locations. Similarly, vehicle movements to and from the site will be minimal.

Given the nature of the works discussed above, no vibration effects are expected at off-site locations.

With respect to the EPA criteria for description of effects, the potential effects at the nearest noise-sensitive location associated with the remedial phase as described, are negative, not significant, and long-term.

11.7 MITIGATION AND MONITORING MEASURES

11.7.1 Peat Extraction Phase 1988 – 2020 (Drainage, Peat Extraction & Associated Activities)

The assessment in Section 11.6.2 has found that there were no significant noise impacts, therefore no additional specific mitigation measures were necessary. Noise levels were controlled by compliance with the noise condition in the IPC Licence as discussed in Section 11.2.2.1. This also applies to the Current Phase and Remedial phases.

11.7.2 Current Phase (June 2020 to Present Day)

The assessment in Section 11.6.3 has found that there are no significant noise impacts, therefore no specific mitigation measures are necessary during the Current Phase.

11.7.3 Remedial Phase (Future)

The assessment in Section 11.6.4 has found that there are no predicted significant noise impacts, therefore no specific control measures are necessary for the Remedial Phase.

11.8 RESIDUAL EFFECTS

11.8.1 Peat Extraction Phase 1988 – June 2020 (Drainage, Peat Extraction & Associated Activities)

The Noise Impact Assessment has concluded that noise emissions and vibration generated during the Peat Extraction Phase were not significant. Noise emissions associated with the current onsite activities and the future rehabilitation works are expected to be lower than those arising from the historical peat extraction activities. Consequently, any residual noise and vibration effects associated with these phases are considered **long term, negative, but not significant**. Similarly, noise and vibration effects arising from additional traffic on public roads associated with site activities are predicted to result in **long-term, negative, but not significant** effects at the nearest noise-sensitive receptors.

11.8.2 Current Phase (2020 to Present Day)

The residual effects at the nearest noise-sensitive locations associated with the Current Phase are described as negative, not significant and short-term.

11.8.3 Remedial Phase

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

11.9 CUMULATIVE AND INDIRECT IMPACTS

11.9.1 Peat Extraction Phase

The projects considered during the Peat Extraction Phase are identified in Table 2-3 of Chapter 2 and include existing and historic extractive, industrial, energy and other developments in the vicinity of the Application Site.

Of particular relevance to Noise and Vibration are the sand and gravel extraction and associated processing activities located within and adjacent to Derryarkin and Drumman Bogs, together with other developments using the surrounding regional and local road network. Similar activities within the vicinity of the Application Site include:

- Lagan Cement Limited cement, aggregate and construction materials, located in Killaskillen, Kinnegad, County Meath, approximately 1.5 km east of the Application Site (Derryhinch Bog);

- Kilmurray Pre-cast sand and gravel pit and processing plant, located adjacent to the Derryarkin Bog; and
- Other extraction activities and the development of asphalt plant works.

Clonin solar farm is also located in Clonin, Rhode, which borders the Application Site (eastern boundary of Ballybeg Bog).

It can be seen from Figure 11-4, that only certain small areas very close to the Application Site boundary were predicted to exceed the operational noise criterion of 55 dB $L_{Aeq,T}$ adopted in Section 11.2.2 when all equipment was assumed to be operating at the same time on the Application Site boundary. Therefore, for all the other receptors surrounding the Application Site, the noise levels from the peat extraction are below the criteria, at all times. Therefore, noise levels from peat extraction are typically very low and insignificant and will not contribute to a cumulative noise level assessment.

Even when all equipment was assumed to be operating simultaneously on the border of the site, the peat extraction phase was sufficiently quiet that none of the additional projects assessed cumulatively were close enough, or loud enough to the relevant receptors to result in the peat extraction phase causing any increase in noise levels at the receptors.

Therefore, the potential cumulative effects at the nearest noise-sensitive location are **not significant and short-term**.

11.9.2 Current Phase

The relevant projects considered during the Current Phase are identified in Table 2-4 of Chapter 2.

Of particular relevance to Noise and Vibration include permitted and proposed sand and gravel extraction, Derrygreenagh Power Plant, renewable energy and energy-storage developments, residential development, a consented data centre and other infrastructure in proximity to the Application Site. Relevant consented planning applications within the vicinity of the site include:

- Energy-related developments within the Rhode, Derryiron, Clonin, Coolcor, Derrygreenagh and Rochfortbridge areas, including Yellow River Wind Farm, solar farms, battery energy storage systems (BESS), substations, grid connections, gas-fired generation facilities and other energy infrastructure.
- Grid and electricity infrastructure projects, including substation upgrades, transmission connections and overhead line works.
- Mineral extraction and quarrying developments, including sand and gravel extraction proposals in Derryarkin and quarry expansion works in County Meath.
- Large-scale strategic developments, such as the consented Red Admiral data centre and Derrygreenagh Power Plant.
- Agricultural and industrial developments within the study area, including biomass facilities.
- Future strategic infrastructure projects, including the Eastern and Midlands Water Supply Project and proposed Ballinla Wind Farm developments currently awaiting decision.

As noise levels from ‘worst-case’ decommissioning (i.e. if all decommissioning works were to take place simultaneously on the Application Site boundary) are calculated to be lower than that of the peat extraction phase, cumulative effects at the nearest noise-sensitive location are **not significant and short-term**.

In addition, any newer developments would likely be subject to their own noise limits from the planning process that would restrict the potential for cumulative effects further.

Even when all equipment was assumed to be operating simultaneously on the border of the site, the current phase was sufficiently quiet that none of the additional projects assessed cumulatively were close enough, or loud enough to the relevant receptors to result in the current phase causing any increase in noise levels at the receptors.

Therefore, the potential cumulative effects at the nearest noise-sensitive location are **not significant and short-term**.

11.9.3 Remedial Phase

The projects relevant to the Remedial Phase are identified in Chapter 2.

Of particular relevance to Noise and Vibration are the potential future use of lands within the footprint of the Application Site as separate and independent projects, including Derrygreenagh Wind and Solar Project and other third-party infrastructure.

While these projects may result in temporary noise and vibration during their respective construction phases, they constitute separate and independent developments that will be subject to their own planning, environmental assessment and noise assessment processes. The timing, scale and operational characteristics of these projects remain subject to separate consent procedures and implementation programmes.

The noise assessment presented in this chapter demonstrates that noise emissions associated with the Remedial Phase are minimal, temporary in nature and lower than those associated with the Current Phase decommissioning activities. The principal Remedial Phase activities comprise drain blocking and associated rehabilitation works undertaken over a limited duration using mobile plant.

The proposed Derrygreenagh Wind and Solar project will be subject to a separate Environmental Impact Assessment and detailed noise assessment in accordance with applicable national guidance and best practice. Similarly, any future development would be required to demonstrate compliance with applicable noise criteria as part of the relevant planning and environmental assessment processes.

The proposed operational limits at the nearest noise sensitive locations for the Derrygreenagh Wind and Solar project will be confirmed in the associated EIAR. It can be assumed that these limits will align to best practice guidance couched in terms of the $L_{A90,10min}$ parameter which are typically as follows:

- 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.

Taking account of the temporary nature, limited duration and low predicted noise levels associated with the Remedial Phase, together with the requirement for any future developments to comply with their own consent conditions and noise limits, no significant cumulative or in-combination noise effects are predicted. Consequently, cumulative effects at the nearest noise-sensitive locations are considered to be not significant and short-term.

11.10 MAJOR ACCIDENTS AND NATURAL DISASTERS

There has not been any accident or natural disaster that would have created a noise or vibration effect at noise-sensitive locations.

In respect of the future Remedial Phase, given the nature of the proposed activity, there is a low likelihood of a significant effect on the noise or vibration environment due to a major accident or disaster.

11.11 REFERENCES

- British Standard Institute (BSI) *BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise* (BSI, 2014).
- British Standard Institute (BSI) *BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting* (BSI, 2008).
- International Organization for Standardization (ISO) *ISO 1996: 2017: Acoustics – Description, measurement, and assessment of environmental noise* (ISO, 2017).
- National Highways (formerly Highways England) (2020). *Design Manual for Roads and Bridges (DMRB) LA 111: Noise and Vibration Revision 2*

