



11 NOISE AND VIBRATION

11.1 Introduction

This chapter of the EIAR has been prepared by Wave Dynamics Limited an Acoustic Consultancy specialising in noise and vibration. This assessment of the potential likely and significant effects of the proposed lateral expansion of Red Rock Quarry (i.e. the 'Proposed Development') at Clogrennane, Co. Carlow on the environmental noise and vibration impacts.

The assessment considers the noise and vibration impact of the construction phase and operational phase on the surrounding environment. Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated to ensure minimal impact on the receiving noise climate and noise sensitive receptors.

This chapter of the Environmental Impact Assessment Report (EIAR) provides a baseline assessment of the environmental setting of the Proposed Development Site, as described in Chapter 3, in terms of environmental noise and vibration and discusses the potential likely significant effects that the operation and restoration phases of the Proposed Development will have. The assessment considers the noise and vibration impact of the construction phase and operational phase on the surrounding environment. Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated to ensure minimal impact on the receiving noise climate and noise sensitive receptors.

Please note that for the purposes of this chapter, where:

- The 'Proposed Development' is referred to, this relates to all of the project components described in Chapter 3; and,
- The 'Proposed Development Site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary.

11.1.1 Statement of Authority

The section was completed by James Cousins, Managing Director | Principal Consultant with Wave Dynamics who has extensive experience in assessing noise and vibration impacts. James is an experienced acoustic consultant. His qualifications include; BSc (Hons) in Construction Management and Engineering, Pg Cert in Construction Law and Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Competence Cert in Building Acoustic Measurements. James is a member of both Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

James was assisted by Shannon Doherty | Senior Consultant. Shannon is a senior acoustics consultant with over 12 years' experience in noise and vibration, including noise monitoring surveying, assessment and noise control. He has a BSc (Hons) in Music Technology from Queens University Belfast as well as a Post Graduate Diploma in Acoustics and Noise Control from the Institute of Acoustics. Shannon has experience working on major residential, infrastructure, energy and brownfield/greenfield development projects in the UK and Ireland.

This section was peer reviewed by Sean Rocks, Director | Senior Consultant, Sean has experience of numerous planning stage assessments. Sean's qualifications include; BEng (Hons) in Mechanical and Manufacturing Engineering, Diploma in Acoustics and Noise Control (Institute of Acoustics), IOA Certificate of Competence in Environmental Noise Measurement and SITRI certified sound insulation tester. Sean is a member of both Engineers Ireland and the Institute of Acoustics.

11.1.2 Description of the Subject Site and Existing Quarry

The development site consists of an area of 41.86 ha within a total landholding of 45.68 ha, of which c. 8.66 ha is currently subject to an application for substitute consent under Section 177E of the Planning and Development Act 2000 (As amended) to regularise previous unauthorised development. The proposed development will consist of further quarry extraction over an area of 16.17 ha to include the pre-existing quarry and additional agricultural lands with a projected lifespan of c. 20 years. The proposed development will involve blasting, extraction and processing of rock using mobile primary crushing / screening and associated plant on the proposed quarry floor. The proposed quarry void will be extracted over 4 no. phases to a depth of 2 no. benches of c. 10m each to a quarry depth of c. 300m AOD with a proposed rate of extraction of c. 200K tonnes per annum. The proposed development will include for construction of earthen screening berms, soil storage areas and will utilise existing quarry entrance from the northern boundary linking to the L7130 local road to the east. Existing and proposed access tracks and existing settlement ponds will be utilised as part of the proposed development. The proposed development will be accompanied by a phased restoration plan.

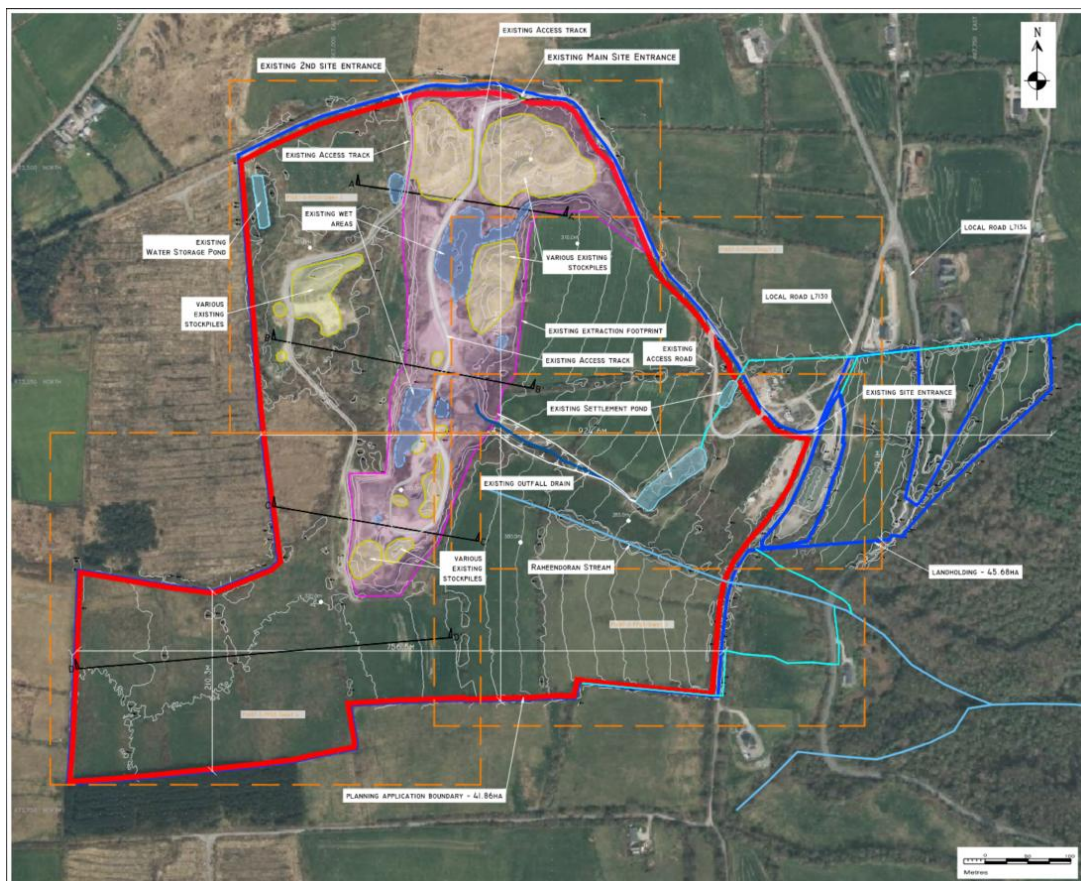


Figure 11.1: Existing Site Layout Map



11.2 Methodology

Assessment of the noise impacts has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter. In addition to specific noise guidance documents, the following guidelines were considered and consulted for the purposes of this chapter:

- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports Draft August 2017
- Transport Infrastructure Ireland (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2014)
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).
- EPA NG4 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)
- Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004
- Carlow County Council Noise Action Plan (2024 – 2028) (Carlow County Council).

The noise and vibration study has been undertaken using the following methodology:

- A baseline noise environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment and to assess the character of the existing noise.
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development.
- Predictive statistical calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site; and
- Mitigation measures have been proposed to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development.

11.3 Assessment Criteria

11.3.1 Construction Phase - Noise

There is currently no statutory Irish guidance for construction noise requirements from noise during the construction phase of a project. In the absence of specific noise limits, the appropriate criteria for the allowable construction noise levels may be found in British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.

The standard (BS5228-1:2009+A1) provides examples of acceptable limits for construction and/or demolition noise in both subjective and objective form. For example, paragraph E.2 of the standard states:



“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”

Paragraph E.2 goes on to state:

“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas”.*

Typically, the local councils refer to BS 5228 Part 1 as a method to control construction noise from sites on the local environment. This standard is therefore the de facto appropriate standard in the absence of regulatory guidance.

Based on paragraph E.2 of BS 5228 the following criteria is adopted for this project:

- For residential properties it is considered appropriate to adopt the 65dB(A) criterion for
- non-residential locations it is considered appropriate to adopt the higher category values of 70dB(A) during the day. These will only be assessed as noise sensitive during office hours.

For the purpose of this assessment buildings other than dwellings which have a residential function will be considered for the lower noise limit, this includes Hotels, B&B's, Student Accommodation, Co Living Developments etc. This is in line with the guidance and definition of noise sensitive residences of EPA NG4. Table 11.1 below outlines the project criteria in tabular form.

Assessment category and threshold value period	Threshold value, in decibels (dB) (L _{Aeq})		
	Category A ¹	Category B ²	Category C ³
Daytime (07:00 – 19:00) and Saturdays (07:00 – 14:00)	65	70	75
Evenings and weekends ⁴	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Table 11.1: Construction Noise Criteria.

- 1) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- 2) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
- 3) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category B values.
- 4) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

11.3.2 Construction Phase – Vibration

The recommended vibration limits to avoid cosmetic damage to buildings, as set out in:

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

The standards note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented below major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in Definitions of the damage categories are presented in BS 7385-1:1990.

Vibration PPV at the closest part of sensitive property to the source of vibration		
Frequency		
4 to 15 Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

Table 11.2: Vibration Limits

Note 1: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded

Note 2: It should be noted that these values are at the base of the building.

11.3.3 Operational Phase – Extraction

EPA NG4

EPA NG4 outlines that noise attributable solely to onsite activities from a licenced premises should not exceed the following limits:

- *Daytime (07:00hrs – 19:00hrs) – 55dB $L_{A,T}$*
- *Evening (19:00hrs – 23:00hrs) – 50dB $L_{A,T}$*
- *Nighttime (23:00hrs – 07:00hrs) – 45dB $L_{Aeq,T}$*

During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations. A penalty of 5dB for tonal and/or impulsive elements is to be applied to the daytime and evening measured $L_{Aeq,T}$ values to determine the appropriate rating level ($L_{A,T}$). In all cases, an assessment by a competent person will be required. During the night-time period no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL.

In addition to the adoption of the EPA NG4 criteria the nearby quarry Clogrennane Lime Limited has noise limits set as follows (EPA (Environmental Protection Agency) waste license (P0400-01):

- 55 dBA L_{Aeq} (30 mins) for Daytime: 07:00hrs - 19:00hrs.

Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004

The primary regulation and guidance for the activities of Quarries and Ancillary in Ireland include the Environmental Protection Agency (EPA) Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004.

The guidelines are intended to offer guidance to planning authorities on planning for the quarrying industry through the development plan and determining applications for planning permission for quarrying and ancillary activities (Part A) and to be a practical guide to the implementation of section 261 of the Planning and Development Act, 2000 (Part B).

Chapter 3 of the guidelines provides the following recommendations for emission limit values (ELVs):

“Noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor.”

- 55 dBA LAeq (1hr) for Daytime: 08:00hrs - 20:00hrs.
- 45 dBA LAeq (1hr) for Night-time: 20:00hrs - 08:00hrs.

Error! Reference source not found. 11.3 below outlines Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004 Emission Limit Levels.

Assessment Category and Threshold Value Period	Threshold Value dB (LAeq)
Daytime (08:00 hrs. – 20:00 hrs.) and Saturdays (07:00 – 14:00)	55
Nighttime (20:00hrs: 08:00hrs)	45

Table 11.2: Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004 Emission Limit Levels.

Carlow County Council Noise Action Plan

The main potential source of operational noise from the development is the excavational plant. There are no specific requirements for operational noise from quarries within the Carlow County Council Noise Action Plan 2024-2028. In our experience Councils would apply the following;

- Daytime 55 dB (A) Leq
- Night-time 45 dB (A) Leq (or exceptionally 40 dB(A) Leq)

Adopted Criteria for the Operational Phase

Considering the development will operate during the daytime period the appropriate daytime criteria for the development in line with typical council Noise Action Plans, Quarry's and Ancillary Activities Guidelines and EPA NG4 is:



- 55 dBA L_{Aeq} (1hr) for Daytime: 08:00hrs - 20:00hrs.

11.3.4 Operational Phase – Additional Vehicular Activity on Public Roads

The noise impact from roads is typically assessed based on the noise impact from the additional volume of road traffic on the adjoining roads.

Design Manual for Roads and Bridges Volume 11, Section 3, Part 7, LA 111 Noise and Vibration

This assessment is based on the guidance given in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 7, LA 111. This document sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation. The Design Manual for Road and Bridges (DMRB), Volume 11, Part 3 Section 7 HD213/11 Revision 1, Noise and Vibration, gives advice on the appraisal of noise and vibration impacts due to changes in road traffic noise and vibration for trunk roads. The DMRB identifies various stages of assessment, with each stage becoming increasingly detailed. The objective of the DMRB noise assessment is to establish the magnitude of the significance of noise changes for areas where existing traffic is likely to at least increase by 25% or reduce by 20%. The DMRB advises that these changes are equivalent to a change in noise level of 1 dB(A), which is the minimum change that can be detected by the human ear in the short term (e.g. on opening of a development or scheme).

The DMRB assessment methodology dictates that all properties experiencing changes in noise greater than 1 dB(A) should be assessed. Properties experiencing a change in noise of less than 1 dB(A) do not need to be considered, the inference being that such a slight change in the level of noise is so small as to be negligible. A doubling or halving of the total flow of traffic would cause the noise level to change by 3 dB(A) which is considered the minimum perceptible change under normal conditions. A change in the noise level of 1 dB(A) is generally only perceptible under controlled conditions. However, the DMRB indicates that those subjected to a sudden change in noise level as low as 1 dB(A), such as that which accompanies the opening of a road scheme, may just perceive the change and experience either a benefit or disbenefit.

11.3.5 Operational Phase – Vibration

Following a review of the operations based on the information provided to us there are no relevant sources of vibration associated with the operational phase, therefore, vibration criteria has not been specified for this phase.

11.4 Existing Receiving Environment

An attended noise survey was conducted to assess the background noise levels and the typical noise sources and levels from the operation of the proposed quarry located in Clogrennane, Co. Carlow.

The attended measurement survey included measurements around the perimeter of the site. The purpose of these measurements was to measure the existing noise climate and use these measurements for predicting the noise impact of the proposed development on the surrounding area.

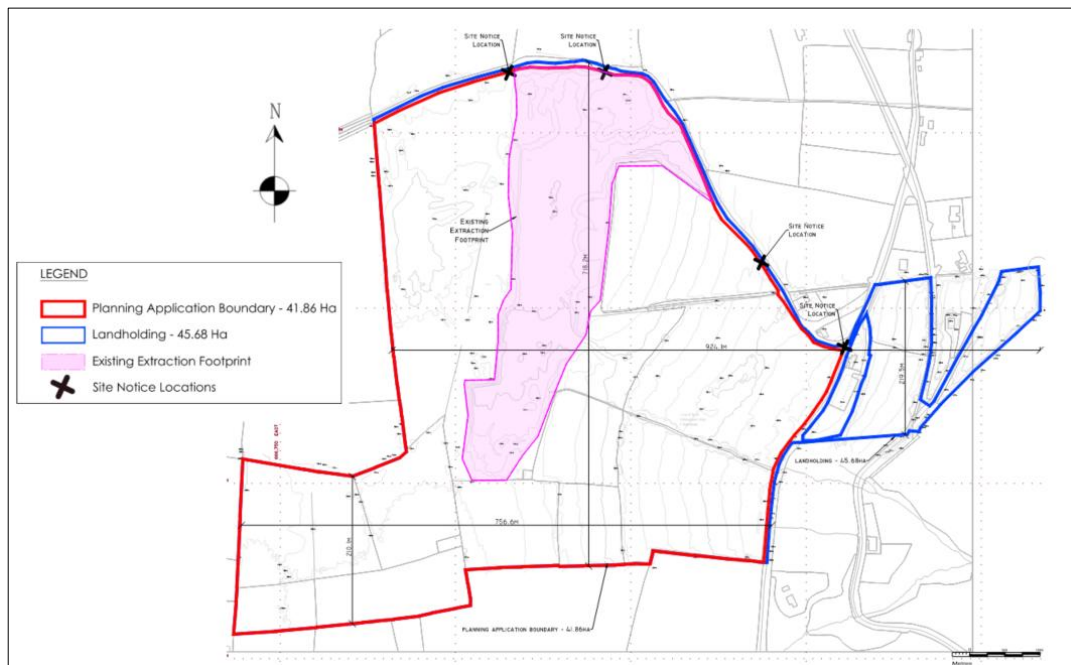


Figure 11.2: Planning Application Boundary.

Attended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. Attended measurements were taken for varying durations based on objective. Background noise measurements were taken over 30-minute and 15-minute periods. Care was taken to avoid any effect on the measurements; the sound level meter was positioned at approximately 1.5m above ground level.



Figure 11.3: Noise measurement setup.

Noise Measurement Equipment

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for both the attended and unattended measurements. Table 11.4 below summarises the measurement equipment used.

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM4	Nti XL2-TA	A2A-23316-E1	UK-23-100	01/09/2025
Sound Level Meter	SLM7	Nor 140	1405924	U48184/ U47386	25/07/2026
Sound Level Meter	SLM8	Nor 140	1403345	U44270/ U44269	16/05/2025
Calibrator	CAL3	Nor 1251	32096	AC240251	03/07/2025

Table 11.4: Measurement equipment used.

Subjective Noise Environment

During the attended noise survey following noise sources were identified:

- Birdsong,
- Planes high overhead,
- Cars passing on the local roads,



- Wind blowing foliage.

Noise Measurement Results

This section outlines the results of the attended noise measurements.

Attended Measurement Results

Table 11.5 outlines the results of the attended measurement survey.

Measurement				Measured Noise Levels (re 20µPa)		
Location	Date	Time (hrs)	Duration (mins)	L _{Aeq} dB	L _{AFmax} dB	L _{A90} dB
A1	07/03/2025	09:45	15	42	57	37
A1	07/03/2025	10:00	15	40	56	37
A1	07/03/2025	10:15	15	41	57	35
A1	07/03/2025	10:30	15	42	64	34
A1	07/03/2025	10:45	15	40	61	36
A1	07/03/2025	11:00	15	39	55	36
A1	07/03/2025	11:15	15	39	51	35
A4	07/03/2025	10:13	30	38	69	38
A4	07/03/2025	10:45	15	43	73	39
A4	07/03/2025	11:00	15	38	57	42
A4	07/03/2025	11:15	15	39	61	42
A4	07/03/2025	11:30	15	39	56	43
A4	07/03/2025	11:45	15	36	55	38
A4	07/03/2025	12:00	15	35	51	38
A4	07/03/2025	12:15	15	37	65	37
A3	11/03/2025	13:24	30	42	62	31
A5	11/03/2025	13:55	30	39	58	33
A3	11/03/2025	13:34	30	43	59	33
A3	11/03/2025	14:34	30	42	58	32
A5	11/03/2025	14:25	30	38	56	32
A2	11/03/2025	14:15	15	44	57	37
A2	11/03/2025	14:30	15	43	57	36
A2	11/03/2025	14:45	15	43	59	37
A2	11/03/2025	15:00	15	43	57	37

Measurement				Measured Noise Levels (re 20µPa)		
Location	Date	Time (hrs)	Duration (mins)	L _{Aeq} dB	L _{AFmax} dB	L _{A90} dB
A2	11/03/2025	15:15	15	44	65	36
A2	11/03/2025	15:30	15	45	59	38
A2	11/03/2025	15:45	15	45	71	38

Table 11.5: Attended measurement results.

Discussion of Measurement Results

The attended background measurements were taken on a weekday with to establish the existing noise conditions at the boundary of the site. The noise around was primarily by road traffic noise. Other sources included birdsong, planes overhead, and wind in foliage.

Weather Conditions for Monitoring Period

Good weather conditions were noted during the attended and unattended survey, with winds typically less than 5 m/s and no rain and clear skies.

11.4.1 Measurement Locations

The following measurement locations around the boundary of the site were selected for the baseline noise survey and to measure the background noise levels at and around the site at Clogrennane, Co. Carlow. The measurement locations A1- A5 can be seen in Figure 11.4 below.

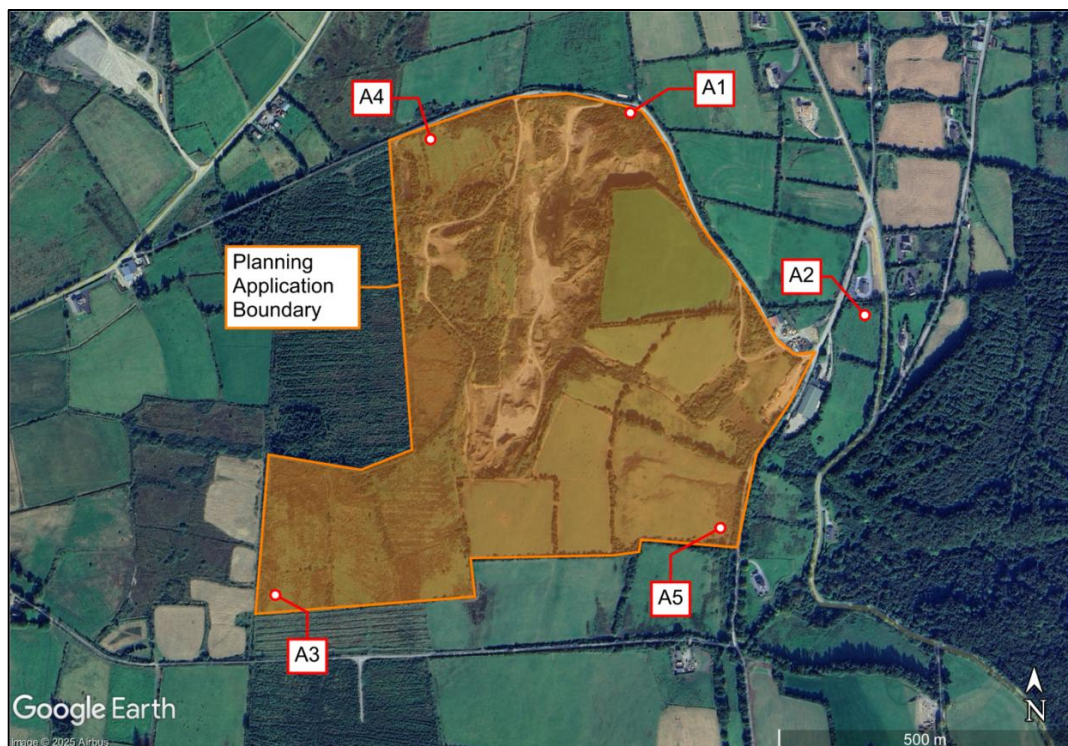


Figure 11.4: Noise Monitoring Locations A1 – A5

Noise Sensitive Receptors

There are number of noise sensitive receptors located in proximity to the development site, these have been identified as follows;

- NSL1 is the residential dwellings located approx. 441m to the southeast of the development.
- NSL 2 are residential properties located approx. 380m to the east of the development.
- NSL 3 are a cluster of residential properties located approx. 559m to the east of the development.
- NSL 4 are a cluster of residential properties located approx. 532m to the northeast of the development.
- NSL 5 is a residential property located approx. 698m west of the development site.

11.4.2 Survey Periods

The attended noise measurements were undertaken on the 7th of March 2025 and on the 11th of March 2025.

Discussion of Measurement Results

The measurements were taken on a weekday to provide an accurate understanding of the noise climate during operational times for the quarry.

11.5 Predicted Impacts of the Proposed Development

11.5.1 Construction Phase

Noise Sensitive Locations and Noise Limits

Based on the location of the site, the construction works and its proximity to the residential receptors the following noise sensitive receptors have been identified:

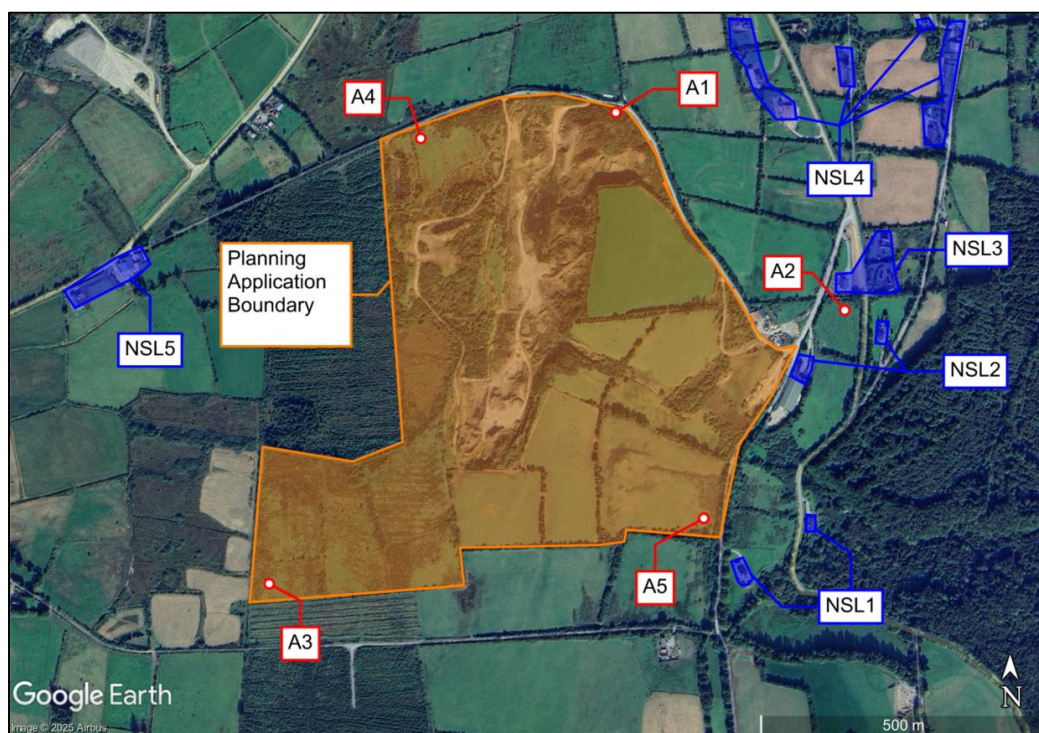


Figure 11.5: Site location, measurement locations, and NSL locations.



Noise Limits

The criteria for the project is based on the criteria outlined in Section 11.3 and the background noise in the area. The project criteria for construction noise is outlined below in Table 11.6. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from construction activities is set as follows for the closest noise sensitive locations:

Construction Noise Limits			
Noise Sensitive Location	Distance To the Centre of The Site	Ambient Noise dB(A) L_{Aeq}	Noise Limit dB(A) ¹ L_{Aeq}
NSL1	441	39	65
NSL2	380	43	65
NSL3	559	43	65
NSL4	532	39	65
NSL5	698	35	65

Table 11.6: Construction noise limits.

1) 65 dB (A) lower threshold limit

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the noise generated by construction activities exceeds the appropriate category value, then a significant effect is deemed to occur.

11.6 Construction Noise Predictions

We understand the construction phase consists of the stripping of the soil from the quarry and muck away. Construction noise for the site has been predicted based on the information provided. A summary of the expected equipment, durations and operating times are provided in Table 11.7. The prediction methodology in BS5228 has been used to calculate the noise level over a typical day for each of the main construction stages.

The closest noise sensitive locations have been identified as the residential dwellings scattered around the development lands.

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level (L_{Aeq} at 10m dB(A))	On Time of 10 hr day
Stripping of the Quarry	Excavators	77	6 Hours
	Dumper 7t	81	5 Hours
	Lorry Idling	80	3 Hours
	Vibratory Roller	74	2 Hours

Table 11.7: Proposed construction equipment, noise levels, and assumed on time.



Table 11.8 summarises the predicted construction noise level at the noise sensitive locations. Examination of the results indicate the construction noise **without mitigation** is predicted to comply with the construction noise limits during all stages of the development.

Location	Noise Limit	Predicted noise level (construction noise + ambient) with <u>no</u> mitigation L _{Aeq} , dB
		Stripping of the Quarry
NSL1	65	48
NSL2	65	49
NSL3	65	47
NSL4	65	47
NSL5	65	46

Table 11.8: Predicted noise levels WITHOUT mitigation for each stage.

Location	Noise Limit	Noise reduction required at each stage of works to meet criteria (dBA)
		Stripping of the Quarry
NSL1	65	0
NSL2	65	0
NSL3	65	0
NSL4	65	0
NSL5	65	0

Table 11.9: Attenuation required based on the construction noise predictions.

Noise mitigation measures will not be required at the construction stage.

11.6.1 Operational Phase

The operational noise impact from the development includes:

- Operational noise from quarrying activities at the proposed site, this includes the extraction stage.
- Operational noise from quarrying activities and the cumulative impact of the existing operations.

At this stage of the design the exact make and model for each piece of plant and equipment is not known for the quarry, therefore, for the purpose of the assessment the plant and equipment for the quarry has been assessed based on assumed plant and machinery from quarries of similar size and purpose, and reference taken from BS 5228-1. The plant and equipment noise levels should be reviewed at design development stage when the actual make and model of the plant and equipment is known, to ensure that the noise levels for the development achieve the criteria outlined in this report. The typical operational noise sources include:



- Screening,
- Loading material,
- Excavating material,
- Infilling material,
- Lorry's transporting material inwards/outwards.

The noise impact assessment for the quarry has been developed based on the attended noise survey, the proposed site location and predicted noise sources. As the site has potential to create noise impact at daytime, a worst-case scenario has been developed for the daytime period predicting the noise impact at the nearest noise sensitive locations.

Operational Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level (L _{Aeq} at 10m dB(A))	On Time of 10 hr day
Stripping of the Quarry	Excavators	77	8 Hours
	Dumper 7t	81	5 Hours
	Lorry Idling	80	1 Hours
	Tracked Crusher	82	5 Hours
	Loading Shovel	82	5 Hours
	Screen Stockpiler	81	5 Hours

Table 11.10: Proposed operational plant, noise levels, and duration.

Assumptions

The following general assumptions were made as part of the operational assessment:

- Assumed daytime operation (worst case).
- Position of plant and equipment assumed as locations are dynamic given the use of the site.
- Assumed an 80% on time for excavators.
- Assumed a 50% on time for all other machinery aside from lorries.
- Assumed 10% on time for lorries inwards/outwards.
- Assumed plant and equipment are not left to idle while not in use.
- Predictions based on the drawings, layouts, information provided and professional experience from similar projects.
- Assumed data as per the tables above.
- It is recognised that the location of the plant and machinery during the operational phase will be dynamic. For the purposes of the assessment the average locations were used.

For the predictions the noise levels were predicted to the nearest noise sensitive receptor therefore these are based on a worst-case scenario.



Location	Daytime Noise Limit (dBA) Leq	Worst Case Daytime Predicted (dBA) Leq 10hr (08:00-18:00)
NSL1	55	52
NSL2	55	53
NSL3	55	50
NSL4	55	51
NSL5	55	49

Table 11.3: Predicted operational noise levels at each NSL.

Additional Traffic Generated by The Development

The potential for cumulative noise impacts from traffic associated with the proposed quarry operations has been considered. Under the proposed development, there will be a managed transition of quarrying activities from the existing site to the new extraction area. As part of this transition, associated heavy vehicle (HV) movements will also transfer from the existing quarry to the proposed development. There will be no simultaneous or additional HV traffic generated by the two sites operating in parallel. Rather, the proposed development represents a continuation of existing traffic volumes along the local road network, not an intensification. Given that the total volume and routing of quarry-related traffic is expected to remain consistent with current levels, and considering the absence of other significant traffic-generating developments in the area, no cumulative traffic noise effects are anticipated.

The Design Manual for Roads and Bridges (DMRB) states that it takes a 25% increase in traffic flows in order to get a 1dBA increase in traffic noise levels. Traffic flow increases associated with the proposed development will be significantly less than 25% and hence traffic noise level increases will be significantly less than 1dBA. It is generally accepted that it takes an approximate 3dBA increase in noise levels to be perceptible to the average person (Ref: Planning Policy Guidance Note 24 [PPG24 - Planning & Noise]). Construction traffic noise levels associated with the Proposed Development will not have a negative impact on nearby noise sensitive locations (NSLs). The magnitude of effect is no impact.

Magnitude of Impact	Increase in Traffic Noise Levels (dB)
No Impact	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

Table 11.4: Likely Effect Associated with Change in Construction Traffic Noise Levels.

11.6.2 Blasting

Blasting, common in quarries but absent in sand and gravel pits, produces vibration, noise, flyrock, and dust. While these vibrations are typically below levels that cause structural



damage, they can disturb nearby buildings and individuals, leading to annoyance. The accompanying air overpressure can further exacerbate these impacts.

The Proposed Development will involve the extraction of ~3.9 million tonnes of rock across a 20-year operational period down to a final floor level of 300mOD.

Bedrock will be extracted using blasting techniques which were previously utilised at the Proposed Development Site during the historic quarrying activities.

Best practice/mitigation measures for blasting are outlined in Section 10.7 of this Chapter.

11.6.3 Cumulative Impact

As part of the environmental impact assessment process, the potential for cumulative noise and vibration impacts has been considered regarding the operation of the proposed quarry in conjunction with existing and approved developments within the surrounding environment. Please refer to Appendix 2.1 for a list of existing and approved developments within the surrounding environment which may potentially result in a cumulative impact with the proposed development.

Considering the above, and having regard to the spatial arrangement of the sites, the proposed operational activities at the proposed quarry, it is concluded that there is no potential for significant cumulative noise or vibration effects. As such, cumulative impacts associated with the operational phase of the proposed quarry can be screened out from further detailed assessment in this EIAR.

11.6.4 “Do Nothing” Impact

Under the Do-Nothing scenario, the prevailing noise environment at the closest noise sensitive locations will remain in line with those measured during the baseline study and hence will be of neutral effect in terms of noise.

11.7 Avoidance, Remedial & Mitigation Measures

11.7.1 Construction Phase Noise

Noise Mitigation Recommendations

Best practice control measures for noise from construction sites are found within BS 5228 (2009 +A1 2014) part 1. Construction noise impacts are expected to vary during the construction phase of the project, this impact will depend on the distance between the construction activities and noise sensitive receptor. The contractor will ensure that all best practice noise and control methods will be used, to ensure any negative noise impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Part 1 includes guidance on several aspects of construction site mitigation measures, this includes:

- The selection of quiet plant and equipment
- Noise control at source of the noise
- Screening; and
- Public liaison.



General Recommendations

This section of the report sets out noise mitigation options and detailed comment on each one specifically for this site.

Selection of Plant and Machinery

The noise impact of all plant and machinery should be assessed prior to selection of the plant for the project. Where an item of plant is identified as noisy with the potential to cause a negative noise impact it should be reviewed to check if there is an alternative quieter version of the same plant to undertake the same construction task.

Noise Control at Source

Where replacing a noisy item of plant is not viable or practical, consideration should be given to control that noise at source. This includes modifying the piece of plant or machinery to generate less noise, using dampening to control vibration induced noise or rattling. Example best practice mitigation measures to be considered are as follows:

- All plant and equipment to be switched off when idling.
- The use of white noise reversing alarms.
- Restriction on the dropping and loading of materials to less sensitive hours.
- The use of local screening for noisy activities or works with hand tools.
- Not dropping materials onto hard surfaces and using rubber mats etc for the dropping of materials.
- Ensure all plant and equipment is well maintained and cleaned, all lubrication should be in line with manufacturers guidelines.

Screening

Screening when used correctly can be an effective method of reducing the construction noise impact on the NSL's. The use of site hoarding and careful selection of areas for noise works, using buildings on the site, site offices and the building being constructed to screen noise from the works.

Local screening of noisy works with the use of temporary acoustic barriers, examples are provided below:

- <https://ventac.com/acoustic-products/noisebreak-acoustic-barrier/>
- <https://echobarrier.com/>



Figure 11.6: Temporary Construction Noise Barrier © Ventac.

Public Engagement

It is recommended that a public liaison officer should be put forward by the contractor to liaise with the local residents on matters relating to noise. Residents should be informed of any noise works scheduled where there is the potential to generate high levels of construction noise or if specialist works etc need to be conducted out of the working hours. This person should also be the point of contact for all complaints and be responsible for reviewing the noise monitoring results and exceedances.

"Worst Case" Scenario

The development has been assessed based on the "worst case" scenario basis. It considers all plant and equipment operating at the same time for both the operational assessment of the new development and the cumulative impact assessment.

11.7.2 Construction Phase Vibration

Given the distance to the vibration sensitive receptors and the works during the construction phase it is not anticipated that vibration from the construction phase will have any negative impact.

11.7.3 Operational Phase Noise

Blasting

Blasting can be an emotive issue for residents around an opencast site. Good liaison between operator and residents is essential to prevent unnecessary anxiety. Wherever possible, the operator should inform each resident of the proposed times of blasting and of any deviation from this programme in advance of the operations. On each day that blasting takes place it should be restricted as far as practicable to regular periods.

The nearer a site is to noise-sensitive receptors or locations, the more stringent should be the controls on noise emissions. During any blasting there are several methods of noise control:

- Earth mounds erected around the site boundary can provide acoustic as well as visual screening. A buffer zone can be maintained between the excavation area



and the site boundary; the width of the zone needs to be decided on a case-by-case basis, depending on such factors as the nature and scale of extraction and the settlement pattern in the vicinity. Soft ground (e.g. grassland and cultivated fields) attenuation can sometimes have a greater impact in reducing noise than barrier attenuation, especially if the ground supports sound-absorbing vegetation;

- Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening. It is important that sound-reduction equipment fitted to machinery is used and maintained properly;
- Haul roads within the site should have as low a gradient as possible, and paving should be considered if practicable where noise-sensitive receptors are likely to be affected;
- For deep workings, quarry faces may provide a barrier, depending on the relative location of the quarry face and the noise-sensitive area or property;
- The professional control of drilling and blasting operations can ensure, through design of the layout of the workings, that blasts are directed away from sensitive neighbouring dwellings. Use of the “delayed” blasting technique, whereby the blast takes place in a series of timed small explosions rather than a single large blast, helps to minimise the vibration in the rock body; and
- It is recommended that quarry operators provide advance notification of blasting to nearby residents, e.g. through written notices or by using warning sirens, or other locally agreed arrangements.

11.8 Residual Impacts

11.8.1 Construction Noise

There is the potential for some construction noise impact during the construction phase of the development.

During the construction phase of the project there is the potential for some adverse effects on nearby noise sensitive properties due to noise emissions from site activities as summarised in Table 11.13 below. Set noise limits, hours of construction and the implementation of the mitigation measures outlined in this section will ensure that construction noise and vibration is limited to short term with slight/no significant effect.

Quality	Significance	Duration
Negative	Slight	Short term

Table 11.13 Likely Construction Noise Impact.

Vibration

Given the distance to the vibration sensitive receptors, the mitigation advice and our experience of measuring similar vibration effects it is not predicted that construction vibration will have a negative impact on the sensitive receptors.

Operational Noise

The noise impacts associated with the operation of the development is summarised in **Error! Reference source not found.** below.

Quality	Significance	Duration
Neutral	Minor	Long-term



Table 11.5: Likely Operational Noise Impact.

It can be concluded based on the assessment, the information provided and assumptions outlined in this section that, once operational, noise levels associated with the proposed development will not exceed project criteria provided guidelines outlined in this EIAR are followed.

11.9 Cumulative Impacts

A list of existing and approved developments within the surrounding environment which may potentially result in a cumulative impact with the proposed development has been prepared, please refer to Appendix 2.1. The applications are all relatively minor agricultural and domestic related.

11.9.1 Potential Cumulative Impacts from Committed Developments

The potential for cumulative impacts associated with committed developments has been assessed. Due to the current uncertainty regarding construction timelines, it is not possible to confirm whether the construction phases of the committed developments will overlap with that of the proposed quarry development.

However, based on the nature of the committed developments and the spatial separation between sensitive receptors and the respective sites, cumulative noise and vibration effects during the construction phase are not anticipated to be significant.

Regarding the operational phase, potential in-combination effects have also been considered. Given the separation distances and geographic context of the developments, it is considered unlikely that cumulative noise impacts would arise at sensitive receptors. Furthermore, there are no relevant sources of operational vibration associated with the proposed or committed developments; therefore, no cumulative vibration effects are expected during the operational phase.

11.10 Monitoring

11.10.1 Construction Phase

Construction Noise Monitoring

Construction noise monitoring will be undertaken at periodic sample periods on the boundary with the nearest noise sensitive receptors by the Quarry operator.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Vibration Monitoring

Vibration monitors should be erected during the site setup and access road construction works phase of the development. These should be erected on the boundary with the nearest sensitive receptors to the site.

The Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures –



Guidelines for the measurement of vibrations and evaluation of their effects on structures.

Vibration Limits

The recommended vibration limits to avoid cosmetic damage to buildings, as set out in:

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

The standards note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented below major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in Definitions of the damage categories are presented in BS 7385-1:1990.

Vibration PPV at the closest part of sensitive property to the source of vibration		
Frequency		
4 to 15 Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

Table 11.5: Vibration Limits

Note 1: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded

Note 2: It should be noted that these values are at the base of the building.

11.10.2 Operational Phase

The noise impact assessment has found that the predicted noise levels do not exceed the targeted project criteria at nearby noise sensitive locations during the operational phase and therefore no remedial or reductive measures are required. The predictions are based on the information available at planning stage and when the actual plant to be used becomes available it should be verified to ensure compliance. General recommendations for the management of noise include:

A noise policy should be created for the site. The noise policy should include but is not limited to policies on the following:

- Trucks/vans/lorries should not be left to idle when loading/unloading or when parked on the site.
- Shovel operators should ensure they are not slamming/dropping buckets when loading/unloading trucks and rubber matting should be used where possible.
- There should be no amplified music or announcements externally in the yard areas.
- Signage should be erected in the yard and in the car park to remind workers that should be respectful to the company's neighbours.



It is recommended that periodic noise monitoring is undertaken during the operational phase in line with the following guidelines:

- EPA NG4 (2016) – Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) and;
- ISO 1996-2:2017 – Description, measurements and assessment of environmental noise.

It is understood that the adjoining quarry includes an EPA licence condition that requires periodic monitoring it is recommended that the same periodic monitoring is applied to the proposed development to confirm compliance with the project criteria.

11.10.3 Restoration Phase

Restoration of the site will commence once bedrock extraction has concluded. All quarrying activities will cease, and existing site infrastructure and plant will be cleared and transported off-site for disposal, recycling, or resale. Restoration will include:

- Proposed native woodland mosaic to promote and enhance ecological corridors and increase habitat biodiversity. Woodland to include high and low canopy trees in addition to understory and shrub species.
- Soil storage areas to be planted with woodland mosaic.
- Existing boundary vegetation to be retained and protected.
- Proposed settlement pond.
- Proposed beams used to regrade steep slope faces
- Proposed riparian planting
- Quarry floor will be allowed to naturally regenerate.

Based on the above, the restoration of the Proposed Development Site will have a neutral impact. No negative effects on the noise and vibration impacts are expected during the restoration phase or post restoration. The restoration will have a positive effect in terms of returning the proposed extraction area back to its existing agricultural use.

11.11 Interactions

The interaction between Noise and Vibration and other Chapters in this EIAR is primarily limited to Chapter 13 Traffic and Transportation. This noise and vibration assessment chapter has been prepared in consideration of and in conjunction with the relevant outputs of the Traffic and transportation chapter where appropriate.

The interaction between noise and traffic is through the generation of construction and operational stage traffic. It is predicted that there will be a marginal increase in LVs and HVs on the adjoining road network due to the operation of the proposed development. Overall predictions are that there will be no significant noise impact generated during either the construction or operational phase of the proposed development site, in the context of existing traffic flows.

11.12 Difficulties Encountered When Compiling

No difficulties were encountered when compiling this section.



11.13 References

- 1) ISO 9613-1:1993 Acoustics Attenuation of sound during propagation outdoors.
- 2) ISO 9613-2:1996 Acoustics Attenuation of sound during propagation outdoors
- 3) Part 2: General method of calculation
- 4) Part 1: Calculation of the absorption of sound by the atmosphere
- 5) EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- 6) EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- 7) EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports Draft August 2017;
- 8) EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015);
- 9) Quarries and Ancillary Activities: Guidelines for Planning Authorities: April 2004
- 10) Carlow County Council Noise Action Plan (2024-2028)
- 11) BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;
- 12) BS8233:2014 Guidance on sound insulation and noise reduction for buildings.
- 13) Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development (Northern Ireland);
- 14) British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.