Contents

Tables

Figures

Appendices

Introduction

Background

10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential noise and vibration impacts arising from the proposed establishment and operation of a bio-renewables production facility (incorporating anaerobic digestion) at within the southwest corner of the existing and permitted Killough hard rock quarry, Holycross, County Tipperary.

10.2 The proposed bio-renewables production facility (incorporating anaerobic digestion) compound will cover an area of c. 4 hectares with c. 16,821.5m² of new buildings consisting of an administration building; a dry matter reception building; a workshop; a bio-conversion building; a pre-treatment, equalisation and gas upgrading building; a digestate handling building; a warehouse storage building; a bio-filling station building; an odour abatement and pumping station building; a linear generator building; and an ESB sub-station building.

10.3 Facility will operate 24 hours a day / 7 days a week and delivery of feedstock will be between the hours of 8am to 6pm Monday – Saturday with no deliveries to occur on Sundays or bank holidays.

10.4 The noise impact assessment presented herein describes and assesses the existing noise characteristics of the local area. The anticipated effects of the proposed development at Killough Quarry are then applied to these baseline conditions and the resulting noise impacts assessed. Mitigation measures are identified where necessary to eliminate or minimise adverse impacts, insofar as practical.

10.5 To assist the understanding of acoustic terminology and the relative change in noise, a glossary of terms and phrases, which specifically relate to this Chapter of the EIAR, is provided in the Glossary of Terminology presented in **Appendix 10-A**.

Methodology

10.6 The following sections of this EIAR Chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:

- regulatory control framework for noise and vibration;
- methodology used to assess potential impacts from activities at noise sensitive locations;
- baseline conditions pertaining to existing background and ambient noise levels around the project site;
- noise and vibrations impact evaluation criteria;
- prediction of the noise and vibrations levels and identification of potential impacts;
- assessment of severity of impacts, with reference to the evaluation criteria;
- description of mitigation measures that will be incorporated into the design and operation of the scheme to eliminate or minimise the potential for noise and vibrations impact;
- a summary of any residual impacts; and
- monitoring proposals.

Consultations / Consultees

10.7 Roadstone elected to organise a public consultation event in the form of a 'Public Information Drop-In Event' at a local hotel (the Horse & Jockey), on the evening of Tuesday

25th June 2024. A local residence letter drop and a newspaper public notice advertisement were carried out in the two week period prior to the scheduled information drop-in event.

10.8 The event was intended to provide an opportunity for potentially impacted local residents and any interested third parties to meet with Roadstone personnel and its advisors to discuss the development and ask any relevant questions.

10.9 To facilitate public engagement and discussion, Roadstone set up display information boards around the meeting room. The display boards provided some background information, proposed layout scheme, brief description of the proposed development along with some 3-D concept views.

10.10 Further details on the public consultation process, attendees and the main issues raised are provided in **Appendix 1-B**.

Contributors / Author(s)

10.11 The noise impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Ronan Murphy MIOA BSc Environmental Management, Diploma Acoustics and Noise Control. Ronan is Principal Acoustic Consultant with 18 years of experience.

Sources of Information

10.12 The prevailing noise levels at noise sensitive locations in the vicinity of the site and haulage routes was determined through on-site measurements. Empirical source data for expected activities during the construction and operational phases was then used to calculate potential noise impacts arising at the same noise sensitive locations.

Limitations / Difficulties Encountered

10.13 This assessment is compiled based on published guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

Potential Impacts of the Proposed Development

Study Area

10.14 The application site comprises an existing quarry facility located in the townland of Gaile townland, Holycross, Co. Tipperary.

10.15 There are isolated private residential property and agriculture farms located throughout the surrounding rural landscape, predominantly along the local road network. The location and proximity of the nearest noise sensitive locations is identified in **Table 10-1** below.

10.16 The main transport route within the area is the M8 motorway, approximately 2.5 km to the southeast of the site. There are also a number regional routes in the area, the R659 and R660, east and south of Holycross respectively; and the R639, the former N8, just east of the M8). Access from the site to the primary road network is via c. 2.5 km of local road onto the M8 Motorway between Urlingford and Cashel.

Nearest Noise Sensitive Receptors

10.17 Noise sensitive receptors (NSR) are defined in the Environmental Protection Agency (EPA) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016) 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".

10.18 The closest NSRs to the application site have been identified and assessed based on their distance from the application site boundary. The relevant NSR's located within 500 metres of the application site ('redline') boundary are identified in **Table 10-1** below.

Table 10-1: Sensitive Receptors in Vicinity of Application Site Boundary

Receptor Reference	Receptor	X	Y
R1	Dwelling	610,458	650,160
R2	Dwelling	610,439	650,136
R3	Dwelling	610,353	650,225
R4	Dwelling	610,224	650,234
R5	Dwelling	610,508	650,068
R6	Dwelling	610,473	649,955
R7	Dwelling	610,656	649,888
R8	Dwelling	610,666	649,859
R9	Dwelling	610,617	649,841
R10	Dwelling	610,043	650,191
R11	Dwelling	609,994	650,113
R12	Dwelling	609,924	650,089
R13	Dwelling	610,710	649,465
R14	Dwelling	610,717	649,386
R15	Dwelling	609,780	649,874
R16	Dwelling	610,091	651,415
R17	Dwelling	610,180	651,723
R18	Dwelling	609,482	650,283
R19	Dwelling	611,157	649,627
R20	Dwelling	611,215	649,608
R21	Dwelling	611,334	649,578
R22	Dwelling	611,232	649,454

10.19 Additional consideration has been given to the proximity of potentially noise sensitive ecological receptors in the vicinity of the site. These sites are identified in **Table 10-2** below.

Table 10-2: Ecological Receptors Within 2 km of Application Site

Natura 2000 Site	Site Code	Approximate Distance to Site
Killough Hill pNHA	00959	5 m (covers parts of existing quarry site)

10.20 Whilst the Killough Hill pNHA is located within the bounds of the larger redline boundary, it is understood that the site does not contain any potentially noise sensitive receptors. In addition, the existing quarry has already been in operation for an extended period of time

(since the 1950's). It would be expected that some degree of habituation or impacts may have already occurred during this period. There is therefore expected to be negligible impacts arising due to noise from the proposed development and impacts on ecological receivers has not been considered further in the assessment.

Potential Noise Impacts from the Proposed Development

10.21 The proposed development will include a number of activities and processes that have the potential to generate noise impacts.

10.22 Additional vehicular movement on the surrounding road network, both initially during the construction stage and longer term due to the import of feedstock and export of biogas and digestate by-products to and from the site.

10.23 The proposals provide for the construction of new site infrastructure. Ground clearance and excavation with heavy machinery, as well as general construction work during this period, will have the potential to give rise to noise impacts off-site.

10.24 Once operational, a range of mechanical plant will be required for processing. It is expected that mechanical plant may operate continuously or intermittently across the site, typical mechanical plant items will include pumps, compressors and blower fans. The CHP and gas flare will also generate noise once operational.

Potential Vibration Impacts from the Proposed Development

10.25 The nature of onsite operations and the distance to the nearest noise sensitive locations is such that the risk of vibration impacts occurring during either the construction or operational phases is negligible and has therefore not been assessed further as part of this assessment.

Interaction with Other Impacts

10.26 The potential impact of noise generated by the proposed development on sensitive receptors including residents and sensitive ecological receptors has been assessed in this Chapter of the EIAR. The impact of the proposed development activity on these receptors is further considered in Chapter 4 'Population and Human Health' and in Chapter 5 'Biodiversity'.

Planning And Development Framework

10.27 The following sections outline the overarching planning policy and legislation relevant to noise management in the extractive industry at the proposed site.

National Planning Framework – Project Ireland 2040

10.28 The National Planning Framework (NPF) 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to a variety of sectors.

10.29 National Planning Framework Objective 65 addresses noise related impact of development and identifies a requirement for Planning Authorities to:

"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."

10.30 The National Planning Framework aims to support the following measures:

- **Noise Management and Action Planning**: Measures to avoid, mitigate, and minimise or promote the pro-active management of noise, where it is likely to have significant adverse impacts on health and quality of life, through strategic noise mapping, noise action plans and suitable planning conditions.
- **Noise, Amenity and Privacy**: This includes but is not limited to, good acoustic design in new developments, in particular residential development, through a variety of measures such as setbacks and separation between noise sources and receptors, good acoustic design of buildings, building orientation, layout, building materials and noise barriers and buffer zones between various uses and thoroughfares.
- **Quiet Areas**: The further enjoyment of natural resources, such as our green spaces and sea frontage, through the preservation of low sound levels or a reduction in undesirably high sound levels, is particularly important for providing respite from high levels of urban noise. As part of noise action plans, an extra value placed on these areas, in terms of environmental quality and the consequential positive impact on quality of life and health, due to low sound levels and the absence of noise, can assist in achieving this.

Local Planning Policy – Tipperary County Development Plan 2022-2028

10.31 The current Tipperary County Development Plan 2022-2028 includes a number of policies and objectives for the planning and sustainable development of the County.

10.32 The Noise Pollution Objectives identified by the County Development Plan are as follows:

- **11-18** Ensure that new development does not result in significant noise disturbance and to ensure that all new developments are designed and constructed to minimise noise disturbance in accordance with the provisions of the Noise Action Plan 2018 and relevant standards and guidance that refer to noise management.
- **11-H** Apply the provisions of the Tipperary County Council Noise Action Plan 2018 – 2023 as it relates to Noise Action Areas in order to reduce disturbance from noise.

Guidance Documents and Assessment Criteria

Noise Arising During Construction Stage

10.33 There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. British Standard BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise* sets out procedure to assess and control construction noise impacts.

10.34 One of the approaches for deriving appropriate construction noise limits is for the designation of a noise sensitive receptor into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with construction activities.

10.35 BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. **Table 10-3** below sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 10-3: Applicable Construction Noise Thresholds (BS5228-1:2009+A1:2014)

Assessment Category and Threshold Value Period	Threshold Values, $L_{Aeq,T}$ dB		
	Category A Note A	Category B Note B	Category C Note C
Night (23:00 to 07:00 hrs)	45	50	55
Evenings and Weekends Note D	55	60	65
Daytime (07:00 – 19:00 hrs) and Saturdays (07:00 – 13:00 hrs)	65	70	75

Note A: Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values

Note B: Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values

Note C: Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values

Note D: Periods defined as 19:00 to 23:00 hrs weekdays, 13:00 to 23:00 hrs Saturdays and 07:00 to 23:00 hrs Sundays.

10.36 Further clarification on prevailing noise climate and relevant construction stage noise thresholds have been discussed in Section 10.67.

Noise Arising from Onsite Operations (EPA NG4)

10.37 Site operations will be classified as a scheduled activity under the Environmental Protection Agency Act 1992 and as such, the facility will require a licence from the Environmental Protection Agency.

10.38 Relevant guidance in respect of noise thresholds and requirements for licensed activities is set out in the Agency's *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, 2016).

10.39 In setting appropriate Noise Criteria, the NG4 guidance stipulates that the site location must be screened to determine potential classification as either a "quiet area" as per the Agency publication *Environmental Quality Objectives - Noise in Quiet Areas (EPA, 2003)* or an area of a "low background noise".

10.40 An area can be classified as a potentially quiet area if the following criteria are satisfied:

- At least 3 km from urban areas with a population >1,000 people;
- At least 10 km from any urban areas with a population >5,000 people;
- At least 15 km from any urban areas with a population >10,000 people;
- At least 3 km from any local industry;
- At least 10 km from any major industry centre;
- At least 5 km from any National Primary Route, and;
- At least 7.5 km from any Motorway or Dual Carriageway.

10.41 In this instance, the application site and nearest noise sensitive dwellings are located between 1,650 metres from the M8 motorway which runs to the east of the site. As such, the site does not satisfy the criteria to be classified as a "quiet area" as per the NG4 guidelines.

10.42 In addition to quiet area screening, a series of noise measurements has to be completed at the nearest NSR's to determine prevailing noise levels and to screen for potential low background noise levels.

10.43 An area can be considered as having low background noise levels when the following criteria are satisfied:

- Average Daytime Background Noise Level ≤ 40 dB L_{AF90}, and
- Average Evening Background Noise Level ≤ 35 dB L_{AF90}, and
- Average Night-time Background Noise Level ≤ 30 dB L_{AF90}.

10.44 The NG4 guidance states that the average background noise level for a specific period is the "arithmetic average of the measured L_{AF90} noise levels during the relevant period" and that low background noise levels are deemed to be present if "all three of the criteria are satisfied".

10.45 The appropriate noise criteria applicable to the operation can be determined by reference to **Table 10-4** below.

Table 10-4: EPA NG4 Operational Criteria Screening

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00 hrs)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00 hrs)	Night-time Noise Criterion, dB $L_{Aeq,T}$ (23:00 to 07:00 hrs)
Quiet Area	Noise from the licensed site to be at least 10dB below the average daytime background noise level measured during the baseline noise survey.	Noise from the licensed site to be at least 10dB below the average evening background noise level measured during the baseline noise survey.	Noise from the licensed site to be at least 10dB below the average night-time background noise level measured during the baseline noise survey.
Areas of Low Background Noise	45dB	40dB	35dB
All other Areas	55dB	50dB	45dB

10.46 Further clarification on prevailing noise climate and relevant operational noise thresholds is provided in later sections of this Chapter.

Noise Arising from Vehicular Traffic on Public Roads

10.47 There are no specific guidelines of limits relating to traffic related sources along the local or surrounding road network. In this instance, in order to assess the potential noise impact from prospective changes in road traffic, Table 10-5 below offers guidance as to the likely degree of impact associated with a particular change in traffic noise level (Highways Agency Design Manual for Roads and Bridges HA 213/08).

Table 10-5: Likely Impacts Associated with Change in Traffic Noise Level (DMRB, 2011)

Change in Sound Level	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor

3.0 – 4.9	Moderate
> 5	Major

Quantifying Significance of Noise Impacts

10.48 The *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA) are generally recognised as established good practice standards for scope, content, and methodology of noise impact assessment.

10.49 These guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. These guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. An example impact scale offered by the IEMA guidelines is shown in **Table 10-6** below.

Table 10-6: Example Impact Scale from the Change in Sound Levels (IEMA)

Long-Term Impact Classification	Short-Term Impact Classification	Sound Level Change dB L_{pAeqT} (+ive or -ive) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3.0 dB and < 5 dB
Moderate	Major	≥ 5.0 dB and < 10 dB
Major		≥ 10.0

10.50 The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10dB change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

10.51 To determine the overall noise impact, the magnitude and sensitivity Noise Effects Descriptors are presented in **Table 10-7**.

Table 10-7: Noise Effects Descriptors (IEMA)

Noise Effect Levels	Description
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a highly sensitive noise receptor
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a highly sensitive noise receptor
Moderate	A 3 to 4.9 dB L_{Aeq} change in a sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in a sound level at a receptor of some sensitivity

None / Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

10.52 As recognised in the IEMA guidance, there are however many factors which affect people's perception and their responses to noise. Guidance on assessment of the magnitude of noise impact and the significance of the effects are presented in **Table 10-8**.

Table 10-8: Relationship between Noise Impact, Effect and Significance (IEMA)

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)		Significance
Substantial	Beneficial	Receptor Perception = Marked Change Causes a material change in behaviour and/ or attitude, e.g., individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) ↕ (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) Less Likely to be Significant
Moderate		Receptor Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g., turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	
Slight		Receptor Perception = Just Noticeable Improvement Noise impact can be heard but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	
Negligible	N/A = no discernible effect on receptor		Not Significant
Slight	Adverse	Receptor perception = non-intrusive Noise impact can be heard, but does not cause change in behaviour or attitude, e.g., turning up volume of television, speaking more loudly, closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Less Likely to be Significant Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) ↕ Greater justification needed- based on impact magnitude and receptor sensitivities- to
Moderate		Receptor Perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g., turning up volume of television; speaking more loudly; closing windows. Potential for non-waking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	
Substantial		Receptor perception = Disruptive	

Magnitude (Nature of Impact)		Description of Effect (On a Specific Sensitive Receptor)	Significance
		Causes material change in behaviour and /or attitude, e.g., avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	justify a non-significant effect) More Likely to be Significant
Severe		Receptor Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g., regular sleep deprivation / awakening; loss of appetite, significant, medically definable harm, e.g., auditory and non-auditory.	Significant

Receiving Environment

Survey Methodology

10.53 An environmental noise survey was completed to establish the prevailing noise levels in the vicinity of the nearest noise sensitive receptors to the site and associated haul routes.

10.54 The survey was conducted by SLR Consulting Personnel in accordance with the procedures outlined in ISO 1996-2:2017 *Acoustics — Description, measurement and assessment of environmental noise - Determination of sound pressure levels*.

10.55 The noise monitoring locations selected for the purposes of the baseline noise survey are shown in **Figure 10-1** and comprise the following:

- **N01** is located to the west of the site adjacent receptor R4 and was selected in order to establish typical road traffic noise levels arising at dwellings located in close proximity to the road, the microphone was setback approximately 4 metres from the road at a height of 1.5 metres above ground;
- **N02** is located to the east of the site adjacent receptor R8 and was selected in order to establish typical road traffic noise levels arising at dwellings located in close proximity to the road, the microphone was setback approximately 4 metres from the road at a height of 1.5 metres above ground,
- **N03** was located to the south of the side in close proximity to receptors R3, the measurement location was selected to determine the contribution of existing site sources to prevailing noise levels at the nearest most exposed dwelling.

10.56 All measurements were completed using Class 1 Sound Level Meters (Larson Davis 831 and NTi Audio XL3). The sound level meter was calibrated before and after the survey. The calibration deviation was determined to fall within the acceptable range based on the meter specification (+/- 0.8 dB in this instance). The sound level meter was calibrated to traceable standard by a UKAS (United Kingdom Accreditation Service) accredited laboratory within 12 months preceding the measurement.

10.57 Attended noise measurements were completed at survey location N01 and N02 between 13:00 and 13:48 hrs on Wednesday 23rd October 2024 and 11:09 to 12:30 on Thursday 31st October 2024. A meter was left in situ at location N03 and recorded continuous noise levels

between 11:00 hrs on Wednesday 23rd October 2024 and 08:45 Hrs on Thursday 31st October 2024.

10.58 Measurement periods were 15 minutes for all locations, a total of three rounds of measurements were completed at N01 and N02 on a cyclical basis.

10.59 In addition to subjective observations on key sources contributing to the prevailing noise climate, the following noise level indices were recorded:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous noise level over the measurement period, and effectively represents an "average" value.
- $L_{AFMax,T}$ - The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
- $L_{AFMin,T}$ - The minimum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
- $L_{A10,T}$ - The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe intermittent noise sources such as road traffic.
- $L_{A90,T}$ - The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.

10.60 During the attended measurements, weather conditions were generally conducive to environmental noise surveys with light to gentle south-westerly breeze (<4 m/s) present. External ambient air temperature of ~ 10°C was observed. Weather conditions varied during the unattended measurements with periods of elevated wind and rainfall.

10.61 All measurements were completed under free-field conditions (i.e., at least 3.5 m from the nearest vertical reflecting surface), attended measurements were conducted at a of 1.5 m above ground level whilst the unattended measurement was conducted with the microphone at a height of 4 metres.

10.62 All noise levels are recorded in 'A-weighted' decibels, dB(A). A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted in dB(A) relative to a sound pressure of 20 Pa.

Survey Results

10.63 Noise monitoring results for the survey are provided in **Table 10-9** and **Table 10-10**.

Table 10-9: Survey Results at N01 and N02 Attended Monitoring Locations

Location	Time	Free Field Sound Pressure Levels (dB $2x10^{-5}$ Pa)				
		L_{Aeq}	L_{AFMax}	L_{AFMin}	L_{A10}	L_{A90}
N01	13:00 - 13:15	53	78	34	49	38
	11:09 - 11:24	60	82	28	56	37
	11:51 - 12:06	56	80	28	47	31
N02	13:33 - 13:48	60	84	36	52	38
	11:29 - 11:44	64	86	28	56	32
	12:15 - 12:30	61	87	29	52	33

10.64 The following observations are made in respect of attended noise measurements:

- Noise from Killough quarry was not audible at either of the measurement locations;
- Road traffic noise was the dominant contributory noise source at both locations;

- A large proportion of vehicles passing by location N02 comprised heavy goods traffic travelling to and from Killough quarry;
- Other contributory noise sources included birdsong, distant road traffic and farming activity on the adjacent property.

Table 10-10: Survey Results at N03 Unattended Monitoring Location

Measurement Details			Ambient sound level dB $L_{Aeq,T}$		Background sound level dB $L_{A90,T}$	
Day Date Range	Period	Time HH:MM	Range	Typical*	Range	Typical*
Wed 23/10/2024 - Thu 31/10/2024	Day	07:00 - 19:00	31 - 55	47	26 - 52	40
	Evening	19:00 - 23:00	24 - 56	35	21 - 51	32
	Night	23:00 - 07:00	21 - 60	35	20 - 55	34
**Based on modal values occurring within each stated time period*						

10.65 The following observations are made in respect of unattended noise measurements at N03 (verified through post survey analysis of recorded audio files):

- Noise from Killough quarry site activities was audible intermittently during the daytime period, during the nighttime period noise from the limestone plant was audible and comprised the dominant background noise source (specific noise estimated at 34 dB L_{A90}) ;
- Other contributory noise sources included birdsong, distant road traffic and farming activity on the adjacent property.

Clarification of Assessment Criteria

Construction Stage Noise Limits

10.66 The hours of construction for the proposed development will be limited to the daytime period, Monday to Friday from 08:00 to 18.00 hrs, with no works on weekends or public holidays.

10.67 The applicable construction noise limits based on the prevailing daytime noise climate and BS5228-1 thresholds have been summarised in **Table 10-12** below.

Table 10-11: Applicable Construction Noise Limits

Monitoring Location	Baseline Daytime Noise Level (L_{Aeq}, dB), rounded to nearest 5 dB	BS5228-1:2009 +A1:2014 ABC Method Category	Applicable Noise Threshold ($L_{Aeq,T}$)
N01	55	A	65
N02	60	A	65
N03	47	A	65

Operational Stage Noise Limits

10.68 It is important to note that the “low background noise” criteria outlined in NG4 guidelines apply if measured noise levels during the day, evening and night period ALL fall below the relevant thresholds of ≤40 dB L_{AF90} during the daytime, ≤35 dB L_{AF90} for the evening and ≤30 dB L_{AF90} during the night period.

10.69 The results of unattended monitoring at location N03 demonstrate that the typical night-time background noise levels in the vicinity of the nearest noise sensitive location fall in the region of 34 dB L_{A90} for the majority of the time.

10.70 As such, the prevailing noise levels cannot be classified as low background in accordance with the EPA NG4 guidance and the standard EPA operational thresholds will apply as follows:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$;
- Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$;
- Night-time (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

10.71 A penalty of 5 dB 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 ($L_{Ar,T}$). No tonal or impulsive noise shall be permittable during the night-time period.

Assessment of Likely Significant Effects

Do-nothing Scenario

10.72 At present, the prevailing noise climate at the nearest noise sensitive locations is influenced by existing operational noise from Killough Quarry, road traffic along the local road network including quarry related traffic and agricultural activity on adjacent landholdings.

10.73 Over time, changes in the prevailing noise levels would be impacted by variations in road traffic volumes as well as changes in the land use of the adjacent sites. Whilst it is expected that road traffic volumes would gradually increase, it would be difficult to assume whether the adjacent landholdings would remain in dairy and beef farming activities. Overall, it would be expected that prevailing noise levels would remain generally similar in the short-to-medium term.

Potential Impacts During Construction Stage

10.74 The proposed development will require a period of construction. Key works will include the following:

- Removal of materials stockpiles and levelling of existing area;
- Excavation of trenches for services and subterranean infrastructure and foundations for buildings and water ponds;
- Erection and cladding of steel structures;
- Laying down hardstand and internal roads;
- Fitout and commissioning plant.

10.75 A range of construction plant items will be required to facilitate the construction of the new site infrastructure, these shall include:

- 13 to 20 tonne excavator with digging bucket;
- Dumper truck for removal of stockpiled aggregate;
- Loader for backfilling aggregate;
- Hand tools (angle grinder, nail gun, circular saw) for construction and installation of formwork and cutting rebar for foundation and ramps;
- Concrete truck for installation of foundation and retaining walls ;

- Petrol poker for settling concrete in formwork; and,
- Mobile crane for lifting and installation of weighbridge, wheelwash, etc;

10.76 Construction noise calculations have been conducted generally in accordance with British Standard BS5228-1:2009+A1:2014.

10.77 At the present time, a construction programme including specific plant items is not available and predictions of construction related noise cannot be completed without introducing a degree of uncertainty.

10.78 The proposed construction works would be completed in a number of phases. However, it is expected that the works would likely be completed consecutively without any overlap period due to the likelihood of the same machinery being required for each phase of work.

10.79 It is possible to reduce this uncertainty somewhat by assessing worst-case noise levels using empirical source data set out in BS5228-1:2009+A1:2014 guidance.

10.80 **Table 10-12** outlines source noise data based on the list of plant items listed in 10.75.

Table 10-12: Source Data for Construction Stage Assessment

Phase	Source	BS5528 Ref	Noise Level at 10 m (dB $L_{Aeq,1hr}$)	Qty	Activity as % of 12 hr	Corr. to $L_{Aeq,12hr}$	Activity $L_{Aeq,12hr}$	Phase Total $L_{Aeq,12hr}$
Site Clearance	Tracked excavator (170 kW/30 t)	C.2.16	75	1	67	-2	73	87
	Articulated dump truck (tipping fill) (187 kW/23 t)	C.2.32	74	1	67	-2	72	
	Loader ж (184 kW/23 t)	C.10.17	84	1	67	-2	82	
	Articulated dump truck ж (239 kW/23 t)	C.10.19	87	1	67	-2	85	
Foundation and hardstand	Tracked excavator (170 kW/30 t)	C.2.16	75	1	67	-2	73	80
	Cement mixer truck (discharging)	C.4.18	75	1	67	-2	73	
	Cement mixer truck (idling)	C.4.19	71	1	67	-2	69	
	Poker vibrator	C.4.33	78	1	67	-2	76	
	Hand Tools	Other	59	1	67	-2	57	
	Nail Gun	Other	73	1	67	-2	71	
Steel erection	Telescopic handler (60 kW/10 t)	C.2.35	71	1	67	-2	69	79
	Wheeled mobile crane (275 kW/35 t)	C.4.43	70	1	67	-2	68	
	Wheeled mobile crane (idling) (275 kW/35 t)	C.4.44	60	1	67	-2	58	
	Angle grinder (grinding steel) (2.3 kW/4.7 kg)	C.4.93	80	1	67	-2	78	
	Hand Tools	Other	59	1	67	-2	57	
Fitout and landscaping	Telescopic handler (60 kW/10 t)	C.2.35	71	1	67	-2	69	76
	Articulated dump truck (tipping fill) (187 kW/23 t)	C.2.32	74	1	67	-2	72	
	Tracked excavator (66 kW/14 t)	C.2.25	69	1	50	-3	66	
	Hand Tools	Other	59	1	50	-3	56	
	Nail Gun	Other	73	1	50	-3	70	

10.81 Predictions of construction related noise impacts have been made having regard to the following :

- The existing topography of the site and extant boundary berms provide some inherent acoustic screening. For the construction phase, the path differences applicable at each receptor have been calculated using available DTM (digital terrain model) topography for the site and surrounds. The screening correction represents worst case predictions as source heights are all based on upper heights for steel erection works (9 to 12 metres above ground) relative to height of the receivers (4 metres above ground), in reality the majority of construction works will occur at lower heights and a higher degree of screening will be achieved, particularly by the existing berm to the south of the site;
- A correction of +3 dB has been applied to all predicted values to model reflections from the façade;
- All noise sources have been modelled at a height of 4 metres above ground; and
- Propagation assumes 80% soft ground cover for all receptors.

10.82 The predicted noise levels for each of the nearest NSRs during the construction phase has been summarised in **Table 10-13** below.

Table 10-13: Predicted Construction Stage Noise Levels

Receptor Reference	Threshold Applicable (dB $L_{Aeq,12hr}$)	Screening	Predicted Construction Noise Level (dB $L_{Aeq,12hr}$)			
			Site Clearance	Foundation and Hardstand	Steel Erections	Fitout and Landscaping
R1	65	-2	57	50	49	45
R2	65	-2	56	49	48	45
R3	65	-1	57	50	49	46
R4	65	-4	54	47	46	43
R5	65	-3	53	46	45	42
R6	65	-2	53	46	45	42
R7	65	-1	53	46	45	42
R8	65	-1	53	46	45	42
R9	65	-1	52	45	44	41
R10	65	-4	51	44	43	40
R11	65	-4	50	43	42	39
R12	65	-19	30	23	22	18
R13	65	-19	30	23	22	18
R14	65	-1	48	41	40	37
R15	65	-2	49	42	41	38
R16	65	-6	47	40	39	36
R17	65	-3	47	40	39	36
R18	65	-1	48	41	40	37
R19	65	-1	49	42	41	37

Receptor Reference	Threshold Applicable (dB $L_{Aeq,12hr}$)	Screening	Predicted Construction Noise Level (dB $L_{Aeq,12hr}$)			
			Site Clearance	Foundation and Hardstand	Steel Erections	Fitout and Landscaping
R20	65	-1	48	41	40	37
R21	65	-1	47	40	39	36
R22	65	-1	47	40	39	35

10.83 The predicted construction noise levels as presented in **Table 10-13** demonstrate that construction noise levels will fall below the adopted threshold of 65 dB $L_{Aeq,12hr}$ at the nearest noise sensitive locations. Construction noise would therefore be considered to give rise to temporary slight to moderate impacts.

10.84 Notwithstanding the findings of the construction phase noise impact assessment, best practice construction noise and vibration management practice should be adhered to and implemented as a matter of course. Further details in respect of these practices are presented and discussed later in this Chapter (Sections 10.112 to 10.113).

Potential Impacts During Operational Stage

10.85 The primary sources of noise during the operational phase will include vehicular traffic around the site and noise from mechanical process plant.

10.86 The technology proposed to be used for biogas regeneration is in-vessel anaerobic digestion using plugflow and biofilm processes, this is Best Available Technology (BAT) that reduces feedstock retention time and reduces space requirements for bioreactors.

10.87 A summary of the proposed processes and buildings has been provided in more detail in Chapter 2. From a noise perspective, it will be feasible for the vast majority of mechanical plant items to be located within fully enclosed structures.

10.88 The impact of the proposals upon the noise environment at the nearest noise-sensitive receptors (NSRs) to the Site has been assessed based on a preliminary plant selection, as the most reliable currently available information in agreement with the client.

10.89 The final selection of all mechanical plant will be subject to a tender process post consent. At this stage the exact specification and noise emissions of the proposed plant is not known.

10.90 In order to inform the assessment of noise impact from the proposed development, SLR Consulting have compiled a list of typical plant items and sound power data for biogas plant. A worst-case reverberant sound pressure level has been determined for each of the buildings based on the volume, quantity and source emissions of typical mechanical plant items to be operational within these buildings. The reverberant sound pressure level was then used to calculate a corresponding Façade and Roof Sound Power Emission data taking into account composite sound insulation performances of various building elements including architectural wall and roof panels, acoustic louvres and acoustic roller and personnel doors. **Table 10-14** provides an outline of the source noise data used in the model.

Table 10-14: Source Data for Operational Phase Assessment

Building	Noise Generating Plant Located Internally	Noise Generating Element				Internal reverberant Sound Pressure Level (dB L_{pA})	Composite Façade and Roof Sound Reduction Index (dB R_w)	Sound Power per Unit Area (L_{WA}/m^2) - Façades including doors and louvres	Sound Power per Unit Area (L_{WA}/m^2) - Roof	Stacks (L_{WA})
		Façade	Roof	Louvres	Stack					
Bioreactor	Bioreactor pumps	y	y	y	n	80	18	58	58	-
CHP	CHP generator	y	y	y	y	85	18	63	63	93
Dry Matter	Loader, low pressure fans	y	y	y	n	80	18	58	58	-
Gas Upgrade	Compressors, vacuum pump	y	y	y	n	80	18	58	58	-
Heat recovery	Condensers	y	y	y	n	75	18	53	53	-
Odour Abatement	Scrubber fans, pumps	y	y	y	n	80	18	58	58	-
Pretreatment	In-line grinder, macerators, pumps	y	y	y	n	85	18	63	63	-
Solid Dryer	Compressors, fans	y	y	y	n	90	18	68	68	-
Water treatment	Pumps	y	y	y	n	70	18	48	48	-

10.91 In addition to the above plant, heavy goods vehicle (HGV) movements within the site boundary have been included in the model based on an estimated quantity of up to 33 no. HGV movements during the daytime period.

10.92 The levels of sound generated by the operation of the proposed Plant has been predicted in accordance with the prediction framework within ISO 9613-2:2024 *Acoustics — Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors*. This method of calculation takes into account the distance between the sound sources and the closest receptors, and the amount of attenuation due to atmospheric absorption. The methodology also assumes downwind propagation, i.e. a wind direction that assists the propagation of sound from the source to the receiver.

10.93 The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA, which implements the latest 2024 version of the ISO 9613-2 standard.

10.94 The model has been developed with the following assumptions:

- A ground factor of G = 1 has been assumed for intermediate ground cover with the exception of road surfaces which haven modelled with ground factor of G = 0;
- Meteorological conditions have been calculated at 10°C, 70% humidity and 3 m/s wind speeds;
- A reflection factor of 3 has been applied for all reflecting surfaces; and,
- All receiver heights have been set at 4 metres above ground to reflect typical first floor window height.

10.95 The model has been developed using digital terrain model topography and drawings for the site.

10.96 The predicted operational noise levels arising from all site activity has been presented in **Table 10-15**.

Table 10-15: Predicted Operational Stage Noise Levels

Receptors	Sound Pressure Level (dB RE 2x10-5 Pa)								
	Daytime (0700 to 1900 hrs)			Evening (1900 to 2300 hrs)			Night (2300 to 0700 hrs)		
	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant
R01	41	55	yes	37	50	yes	37	45	yes
R02	40	55	yes	37	50	yes	37	45	yes
R03	41	55	yes	38	50	yes	38	45	yes
R04	37	55	yes	34	50	yes	34	45	yes
R05	35	55	yes	33	50	yes	33	45	yes
R06	38	55	yes	35	50	yes	35	45	yes
R07	37	55	yes	34	50	yes	34	45	yes
R08	37	55	yes	34	50	yes	34	45	yes
R09	36	55	yes	34	50	yes	34	45	yes
R10	33	55	yes	31	50	yes	31	45	yes
R11	32	55	yes	31	50	yes	31	45	yes
R12	13	55	yes	10	50	yes	10	45	yes
R13	13	55	yes	10	50	yes	10	45	yes
R14	32	55	yes	29	50	yes	29	45	yes
R15	32	55	yes	30	50	yes	30	45	yes
R16	26	55	yes	26	50	yes	26	45	yes

Receptors	Sound Pressure Level (dB RE 2x10-5 Pa)								
	Daytime (0700 to 1900 hrs)			Evening (1900 to 2300 hrs)			Night (2300 to 0700 hrs)		
	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant	Predicted Level (dB $L_{Aeq,T}$)	Relevant EPA Threshold	Compliant
R17	28	55	yes	27	50	yes	27	45	yes
R18	30	55	yes	30	50	yes	30	45	yes
R19	33	55	yes	30	50	yes	30	45	yes
R20	33	55	yes	30	50	yes	30	45	yes
R21	32	55	yes	29	50	yes	29	45	yes
R22	31	55	yes	29	50	yes	29	45	yes

10.97 The predicted noise levels presented in **Table 10-17** indicate that even under typical operational conditions, the relevant operational noise thresholds during the day, evening and night time periods would be achievable subject to the adherence to best practice noise management practices outlined later in this Chapter (in Paras 10.110 to 10.111).

Additional Traffic on Public Roads

10.98 In addition to site-based construction and operational noise, the potential impact of additional development generated traffic on the local road network needs to be assessed.

10.99 Typically, an increase of 25% in road traffic volumes would be required to give rise to a 1 dB increase in road traffic noise levels. In this instance, total development traffic contribution in the opening and design years of 2027 to 2042 would give rise to an expected 9 to 10% increase in overall AADT's values. As such, the impact of additional road traffic from the development would be considered to be negligible in the long term.

10.100 Due to the fact that approximately 66% of the additional road traffic generated by the proposed development during the operational phase will comprise HGVs, it is also appropriate to consider the potential noise generated during peak hours from HGVs.

10.101 The noise level associated with a discrete noise event, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The Sound Exposure Level can be used to calculate the contribution of a series of events to the overall noise level in a given period based on the following formula:

$$L_{Aeq,T} = L_{AX} + 10log10(N) - 10log10(T) + 20log10(r_1/r_2)^1 \ dB$$

where

$L_{Aeq,T}$	is the equivalent continuous sound level over the time period T (in seconds);
L_{AX}	is the "A-weighted" Sound Exposure Level of the event considered (dB);
N	is the number of events over the course of time period T;
r_1	is the distance at which the L_{AX} value has been measured; and,
r_2	is the distance to the assessment location.

10.102 To inform the assessment of potential road traffic noise impacts, during the baseline survey a series of Sound Exposure Levels were recorded for passing HGV's. The measurements were conducted at survey position N02 located approximately 5 metres from the L1309. Vehicles recorded included loaded and unloaded 20 tonne rigid dump trucks (6 no. total) as well as two bulk tank articulated trailers. Traffic speed was estimated at 65 to 70 kmph. The calculated SEL values ranged from 77 to 84 dB L_{AX}. For the purpose of the assessment, the arithmetic average of 82 dB L_{AX} has been used.

10.103 It is understood that when operating at maximum capacity, peak hourly HGV traffic movements for the proposed development could fall in the region approximately 11 vehicles per hour.

10.104 The predicted road traffic noise level arising from increased HGV traffic levels at the nearest noise sensitive locations along the L1309 presented in **Table 10-16**.

[1] The SEL measurement procedure essentially condenses linear noise sources into discrete events, so then 20 log calculation is justifiable when determine propagation with distance from the source.

Table 10-16: Predicted Noise Level Associated with Peak Hourly HGV Along L1309

Receptor	Distance to Haul Route	Screening	Sound Pressure Level (LAeq,1hour, dB RE $2x10^{-5}$ Pa)					DMRB
			Predicted Noise Level	Prevailing noise levels	Prevailing noise levels corrected for distance[2]	Cumulative noise	Change	
R01	10	0	55	62	59	60	+ 1	Minor
R02	10	0	55	62	59	60	+ 1	Minor
R05	14	0	52	62	58	59	+ 1	Minor
R06	45	0	42	62	52	53	+ 0	No Change
R07	25	0	47	62	55	56	+ 1	Minor
R08	8	0	57	62	60	62	+ 2	Minor
R09	18	0	50	62	56	57	+ 1	Minor
R19	34	0	44	62	54	54	+ 0	No Change
R20	34	0	44	62	54	54	+ 0	No Change
R21	34	0	44	62	54	54	+ 0	No Change

10.105 In terms of potential impact, making reference to the DMRB impact assessment rating, the road traffic noise level arising from hourly HGV movements arising when the proposed development is operating at maximum capacity would be considered as negligible to minor receptors located along the L1309.

Cumulative Impacts

10.106 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable future development or activities, together with those generated by the proposed development. The potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

10.107 To identify the potential impact of ongoing, continuous site activities, the predicted specific noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels measured at receptor R3 where existing site noise levels were deemed to be most dominant. The cumulative assessment is presented in **Table 10-19**.

[2] In this instance, the only appropriate method to correct measured ambient noise levels where road traffic noise is dominant is with a 10 log correction. It is also important to note that HGV movements were the dominant influence on measured levels during the survey.

Table 10-17: Cumulative Operational Noise Levels

Receptor	Sound Pressure Level (dB RE 2x10^{-5} Pa)														
	Daytime (0700 to 1900 hrs)					Daytime (0700 to 1900 hrs)					Daytime (0700 to 1900 hrs)				
	Existing baseline	Operational	Cumulative	Difference	Long term impact	Existing baseline	Operational	Cumulative	Difference	Long term impact	Existing baseline	Operational	Cumulative	Difference	Long term impact
R1	47	41	48	+ 1	Negligible	35	37	39	+ 4	Minor	35	37	39	+ 4	Minor
R2	47	40	48	+ 1	Negligible	35	37	39	+ 4	Minor	35	37	39	+ 4	Minor
R3	47	41	48	+ 1	Negligible	35	38	40	+ 5	Minor	35	38	40	+ 5	Minor
R4	47	37	47	+ 0	Negligible	35	34	38	+ 3	Negligible	35	34	38	+ 3	Negligible
R5	47	35	47	+ 0	Negligible	35	33	37	+ 2	Negligible	35	33	37	+ 2	Negligible
R6	47	38	47	+ 0	Negligible	35	35	38	+ 3	Negligible	35	35	38	+ 3	Negligible
R7	47	37	47	+ 0	Negligible	35	34	38	+ 3	Negligible	35	34	38	+ 3	Negligible
R8	47	37	47	+ 0	Negligible	35	34	37	+ 2	Negligible	35	34	37	+ 2	Negligible
R9	47	36	47	+ 0	Negligible	35	34	37	+ 2	Negligible	35	34	37	+ 2	Negligible
R10	47	33	47	+ 0	Negligible	35	31	37	+ 2	Negligible	35	31	37	+ 2	Negligible
R11	47	32	47	+ 0	Negligible	35	31	36	+ 1	Negligible	35	31	36	+ 1	Negligible
R12	47	13	47	+ 0	Negligible	35	10	35	+ 0	Negligible	35	10	35	+ 0	Negligible
R13	47	13	47	+ 0	Negligible	35	10	35	+ 0	Negligible	35	10	35	+ 0	Negligible
R14	47	32	47	+ 0	Negligible	35	29	36	+ 1	Negligible	35	29	36	+ 1	Negligible
R15	47	32	47	+ 0	Negligible	35	30	36	+ 1	Negligible	35	30	36	+ 1	Negligible
R16	47	26	47	+ 0	Negligible	35	26	35	+ 0	Negligible	35	26	35	+ 0	Negligible
R17	47	28	47	+ 0	Negligible	35	27	36	+ 1	Negligible	35	27	36	+ 1	Negligible

Receptor	Sound Pressure Level (dB RE 2x10^{-5} Pa)														
	Daytime (0700 to 1900 hrs)					Daytime (0700 to 1900 hrs)					Daytime (0700 to 1900 hrs)				
	Existing baseline	Operational	Cumulative	Difference	Long term impact	Existing baseline	Operational	Cumulative	Difference	Long term impact	Existing baseline	Operational	Cumulative	Difference	Long term impact
R18	47	30	47	+ 0	Negligible	35	30	36	+ 1	Negligible	35	30	36	+ 1	Negligible
R19	47	33	47	+ 0	Negligible	35	30	36	+ 1	Negligible	35	30	36	+ 1	Negligible
R20	47	33	47	+ 0	Negligible	35	30	36	+ 1	Negligible	35	30	36	+ 1	Negligible
R21	47	32	47	+ 0	Negligible	35	29	36	+ 1	Negligible	35	29	36	+ 1	Negligible
R22	47	31	47	+ 0	Negligible	35	29	36	+ 1	Negligible	35	29	36	+ 1	Negligible

10.108 With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA) and based on the prevailing noise levels measured during the baseline noise survey, the cumulative medium-term noise impact from the proposed development, once it is established, will be negligible.

Mitigation

10.109 Where necessary, the three established strategies for impact mitigation are avoidance, reduction, and remedy. Where it is not possible or practical to mitigate all impacts, then the residual impacts must be clearly described in accordance with the system for impact description set out in the EPA Guidelines.

Construction Phase

10.110 This noise impact assessment has indicated that worst-case construction noise levels will fall within the applicable construction noise threshold limit (65 dB $L_{Aeq,T}$) at nearby NSRs.

10.111 Notwithstanding this, the Applicant intends to implement best practice construction noise and vibration management techniques throughout the construction phase in order to further reduce the noise and vibration impact to nearby noise sensitive receptors.

Construction Noise and Vibration Management Plan

10.112 Prior to commencement of works, the Applicant (and any appointed Contractors) will compile and submit to Tipperary County Council a Construction Noise and Vibration Management Plan (NVMP). The plan shall:

- Outline management processes and mitigation measures to be utilised to remove or reduce significant noise impacts from the intended construction works;
- Define noise and vibration monitoring and reporting;
- Include method statements for each phase of the works including associated specific measures to minimise noise and vibration in so far as is reasonably practicable for the specific works covered by the plan and a detailed appraisal of the resultant construction noise and vibration generated.

10.113 The Applicant will also proactively engage with the local community and notify the public and potential noise / vibration sensitive premises before the commencement of any works which would be likely to generate any appreciable levels of noise or vibration, explaining the nature and duration of the works.

10.114 The Applicant will also distribute information circulars informing the local community of the progress of site-based construction works which will also highlight any likely periods of significant noise and vibration.

10.115 BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise* and BS5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Vibration* are the best practice standard for management of noise and vibration on construction sites and due regard will be had to these when planning and undertaking the construction phase works.

10.116 The standards include guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet and or low vibration emitting plant;
- Control of noise sources;
- Screening;

- Hours of work;
- Liaison with the public; and
- Monitoring.

Operational Phase

10.117 The Applicant also intends to implement best practice noise and vibration management techniques throughout the operational phase of the proposed development to control, and where possible, further reduce the noise impact to nearby noise sensitive receptors.

Mechanical Plant

10.118 All noise generating mechanical plant will be reviewed for potential tonal and impulsive properties or characteristics and ensure that appropriate noise reduction is fitted at source, where practicable.

10.119 Based on the noise emissions of the selected mechanical plant items, the sound insulation performance of all building elements making up the façades, roofs, louvres, roller doors and personnel doors of all process buildings will be designed, specified and constructed in a manner that ensures that applicable noise thresholds can be achieved offsite.

10.120 The CHP exhaust stacks will be fitted with suitable acoustics attenuators as standard.

Process Buildings

10.121 In order to minimise noise breakout, doors to all buildings with potentially elevated levels of noise will be installed with auto rollers or segmented personnel and vehicle access doors.

10.122 Loader operators will be required to restrict heavy impact of the loader bucket against concrete hardstand or material bunkers.

Vehicle Movement within Site Boundary

10.123 Access / internal haul roads will be kept clean and maintained in a good state of repair, specifically any uneven surfaces will be repaired, potholes filled, and large bumps removed to avoid unwanted rattle and “body-slap” from heavy goods vehicles.

10.124 All vehicles delivering and operating on the site will have white noise reversing alarms fitted.

10.125 Vehicles waiting within the application site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines.

10.126 Care will be taken when unloading vehicles to reduce or minimise potential for noise disturbance to nearby residents.

Vehicle Movements on Public Roads

10.127 HGVs / trucks accessing and egressing the proposed development should adhere a 60 kmph speed limit travelling along on the L1309 to ensure road traffic noise impacts at the nearest noise sensitive receptors are minimised.

10.128 All HGVs / trucks travelling to and from the application site will be required to be kept and maintained in good working order.

10.129 Any deliveries to the proposed development site will be programmed to arrive during daytime hours only.

Residual Impact Assessment

10.130 During the construction stage, under a worst-case scenario for noise generation, there is potential for moderate to significant temporary negative impacts.

10.131 The adoption and implementation of best practice Construction Noise Management practices should ensure residual impacts are minimised to the extent that construction noise should give rise to slight negative temporary impacts for the most part and moderate brief impacts on limited occasions.

10.132 During the operational phase, on-site activity arising including mechanical process plant and internal vehicle traffic has the potential to give rise to negligible to minor long-term noise impacts.

10.133 Additional road traffic noise on public roads has the potential to give rise to minor noise impacts, depending on the proximity of the receptor location to the L1309 Local Road. Impacts for properties set back from the road are typically classified as negligible.

Monitoring

10.134 The Applicant will undertake an annual compliance noise survey to establish operational noise emissions arising at the application site and demonstrate compliance with noise emission thresholds set by any grant of planning permission or licence issued by the EPA.

10.135 The survey shall be completed by a Competent Person in accordance with the EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4) using a Class 1 Sound Level meter.

Figures

Figure 10-1
Noise Receptors and Monitoring Locations

Notes:

1. Extract from Ordnance Survey Map No. 66

Legend:

- Applicants Land Interest Area (c.108.3 hectares)
- Planning Application Area (c. 6.3 hectares)
- Offset distances to application boundary (red line)
- R1 — Receptor (Residence) Locations
- Receptor (Other) Locations
- N — Baseline Noise Monitoring Locations

N

1000m
750m
500m
250m

Killough
Sallsquarter
Upper Bohernaspie
Killough Hill
Caraun
Gaile
Moated Site
Church
School
Ballytarsna Castle
L1309 Road
L1309 Road

0 200 400 600 800 1000m

Scale 1:10,000

roadstone
A CRH COMPANY

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Client: Roadstone Ltd.

Project: Bio-Renewables Production Facility at Killough Quarry, Holycross, Co. Tipperary

Figure Title: Baseline Noise Monitoring Locations Plan

Scale	SLR Project No.
1:10,000 @ A3	501.065577.00001

Designed	Drawn	Checked	Authorised
pmc	pmc	smcd	smcd
Date: 09/24	Date: 09/24	Date: 12/24	Date: 12/24

Figure Number: **Figure 10-1** Rev. **0**

CYAL50381397

APPENDIX A
Glossary of Terminology

To assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. To express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10 A-1
Noise Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at one metre away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} is defined as the notional steady sound level which, over a stated period, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.