

CONTENTS

INTRODUCTION	10-1
Background.....	10-1
Scope of Work / EIA Scoping.....	10-3
Consultations / Consultees	10-3
Contributors / Author(s)	10-3
Limitations / Difficulties Encountered	10-3
REGULATORY BACKGROUND	10-4
National Planning Framework.....	10-4
Local Planning Policy- Wicklow County Development Plan	10-5
EPA Noise Guidance for Scheduled Activities (NG4).....	10-5
British Standard 5228: 2009+A1:2014.....	10-7
Guidelines for Noise Impact Assessment (IEMA).....	10-7
Traffic Noise.....	10-10
Guidance on Effects of Industrial Noise on Wildlife.....	10-11
NOISE AND HUMAN HEALTH.....	10-12
WHO Environmental Noise Guidelines	10-12
RECEIVING ENVIRONMENT	10-12
Study Area	10-12
Sources of Information	10-13
Baseline Study Methodology	10-13
Field Survey / Monitoring	10-13
Sensitive Receptors.....	10-15
IMPACT ASSESSMENT	10-17
Evaluation Methodology.....	10-17
Operational Activities	10-17
Post Operational Phase.....	10-21
Traffic Assessment.....	10-21
Unplanned Events (i.e. Accidents)	10-22
Interaction with Other Impacts	10-23
‘Do Nothing’ Scenario.....	10-23
MITIGATION MEASURES	10-23

RESIDUAL IMPACT ASSESSMENT	10-24
CUMULATIVE / SYNERGISTIC IMPACTS	10-25
MONITORING	10-26

TABLES

Table 10-1 NG4 Noise Criteria for Area Designation.....	10-6
Table 10-2 NG4 Permitted Rating Noise Levels	10-6
Table 10-3 Example Impact Scale from the Change in Sound Levels (IEMA)	10-7
Table 10-4 Noise Effects Descriptors (IEMA)	10-8
Table 10-5 Relationship between Noise Impact, Effect and Significance (IEMA).....	10-9
Table 10- 6 Change in Average/Ambient Noise– Noise Impact	10-11
Table 10-7 Specific Noise Levels at Habitat Site.....	10-11
Table 10-8 Summary of Measured Noise Levels, Free Field dB	10-14
Table 10-9 Summary of Measured Noise Levels (Averaged)	10-15
Table 10-10 Natura 2000 and designated sites within a 2km of the Application Site.....	10-15
Table 10-11 Sensitive Receptors.....	10-16
Table 10- 12 Traffic Sensitive Receptors.....	10-16
Table 10-13 Octave Band Noise Spectra for Plant to be used in Assessment.....	10-18
Table 10-14 Operational Noise Levels : Proposed Waste Facility	10-18
Table 10-15 Cumulative Operational Noise Levels : Proposed Waste Facility	10-19
Table 10- 16 Operational Noise Levels at Ecological Receptors : Proposed Waste Facility	10-20
Table 10- 17 Calculated Noise Level of Additional HGVs, free field, dB.....	10-22
Table 10- 18 Worst Case Increase in the Ambient Noise Level, free-field, dB.....	10-22
Table 10- 19 Residual Noise Summary Table	10-24

PLATES

Plate 10-1 CadnaA Traffic Modelling

FIGURES

Figure 10-1 Local Receptors

APPENDICES

Appendix 10-A Glossary of Terminology

Appendix 10-B Noise Calculations

INTRODUCTION

Background

- 10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential noise impacts of the proposed backfilling of an existing hard rock quarry by way of an inert landfill and the operation of a construction and demolition (C&D) waste recovery facilities at Ballinclare Quarry, near Kilbride, Co. Wicklow
- 10.2 The proposed development provides for backfilling of the quarry to its original ground level using imported inert waste, principally soil and stone, generated by construction and development projects in Counties Wicklow, Dublin and Wexford and its long-term restoration to a grassland / scrub habitat, similar to that which existed prior to quarry development.
- 10.3 The application site at Ballinclare Quarry is located approximately 2.5km to the north-west of a small settlement at Kilbride, 2.5km south of the village of Glenealy and 6km south west of Wicklow Town. The M11 Dublin to Wexford Motorway runs less than 0.5km to the east of the site. The proposed development provides for the following:
- Backfilling of the existing void at Ballinclare Quarry to original ground level by developing and operating an inert waste landfill facility with a total intake capacity of approximately 6,165,000 tonnes of inert soil and stone waste and (non-waste) soil and stone by-product and its progressive restoration to long-term scrub / grassland habitat thereafter;
 - Continued use of established site infrastructure and services including, site / weighbridge office, staff welfare facilities, weighbridge, garage / workshop, wheelwash, hardstand areas, fuel and water storage tanks to service the proposed development;
 - Installation of a new weighbridge along the inbound lane of the quarry access road;
 - Decommissioning of any remaining fixed plant and infrastructure associated with former rock extraction activities or with aggregate, concrete and asphalt production activities at the application site
 - Off-site removal of any materials or bulky wastes associated with the former quarrying and production activities;
 - Construction of an industrial shed (portal frame structure) at the paved blockyard area to house crushing and screening equipment and process / recycle inert C&D waste (principally solid / reinforced concrete, bricks, ceramics and solid bituminous waste mixtures);
 - Use of any remaining external paved area surrounding the C&D waste processing shed as a hardstanding area for the external handling and storage of both unprocessed and processed C&D wastes;
 - Separation of any intermixed construction and demolition (C&D) wastes (principally metal, timber, PVC pipes and plastic) prior to its removal off-site to authorised waste disposal or recovery facilities;
 - Installation and operation of a soil washing plant at the former concrete / asphalt production yard to recover sand and gravel and secondary aggregates from soil waste for subsequent use in the production of construction materials
 - Construction of an on-site (passive) wetland treatment system and attendant drainage infrastructure to treat surface water run-off / groundwater collecting in the sump / floor of the quarry area during backfilling / landfilling operations and surface water run-off from the C&D waste recovery area prior to its discharge off-site;

- Re-use of an existing storage shed as a dedicated waste inspection and quarantine facility to inspect and store suspect waste consignments as required;
 - Upgrading and ongoing maintenance of established internal haul roads across the application site;
 - Temporary stockpiling of topsoil pending re-use as cover material for final restoration of the inert landfill / backfilled quarry;
 - Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site backfilling and restoration works and for a short period thereafter.
- 10.4 All traffic to and from the proposed waste facility at Ballinclare Quarry will be routed along the L1157 Local Road, amending the previous one-way system that routed inbound traffic along the L1113 Local Road and outbound traffic along the L1157. Following discussions with the Roads Authority, provision is made for road improvements along the length of the L1157 leading up to the quarry access, including road widening to 6.0m over most of the route length (within the existing road curtilage), with road strengthening and repair overlay and road markings. The proposed road improvement works are not anticipated to require the removal of any trees along this route.
- 10.5 The proposed maximum intake rate of inert waste for landfilling / disposal is 750,000 tonnes per annum. The maximum rate of C&D waste recovery is 50,000 tonnes per annum. Assuming that the maximum combined inert waste / C&D waste intake of 800,000 tonnes / year is sourced entirely from construction and development projects at off-site locations, and assuming 50 working weeks per year, 5.5 working days per week and 20 tonne loads per Heavy Goods Vehicle (HGV), the proposed waste activities will generate up to 150 HGV return trips (300 movements) each working day, or approximately 15 HGV return trips (30 movements) per hour.
- 10.6 This rate of importation is generally consistent with existing / previously permitted HGV traffic levels for former aggregate / concrete / asphalt production activities. The proposed development therefore will not therefore give rise to any change in traffic volumes other than to have HGVs fully laden on the way in as opposed to on the way out. The waste recycling activities will not generate any additional traffic over and above that generated by the intake of waste / by-product materials as a backloading system will be used to ensure that recycled materials are dispatched to destination sites using outbound HGV's (which would otherwise depart the site without a consignment / load).
- 10.7 As backfilling and restoration of a quarry void with imported soil and stone and the recovery of construction and demolition waste are both designated as waste activities, and as the volumes to be managed at this facility exceed specified threshold limits, they will also require a waste licence from the Environmental Protection Agency (EPA).
- 10.8 It is envisaged that weekday working hours will be in line with those in the existing extractive planning permission (Ref. 14/2118), between 08:00 hours and 18:00 hours Monday to Friday, and between 08.00 hours and 14.00 hours on Saturday (but limited to 10 No. occasions in any given year). The facility will be closed on Sundays and Public / Bank Holidays.
- 10.9 An operational vibration assessment has not been undertaken in respect of the proposed development as previous SLR experience and that of the Applicant indicates that little or no vibration arises from activities of this nature and, as such, no vibration assessment is required.
- 10.10 In order to assist the understanding of acoustic terminology and the relative change in noise, a glossary of terms and phrases, which specifically relate to this noise chapter, is provided in Appendix 10-A.

Scope of Work / EIA Scoping

- 10.11 The following sections of this EIAR Chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:
- methodology used to assess potential noise impacts from activities at properties (dwellings and farms) and sensitive ecological receptors;
 - baseline conditions - existing background/ambient noise levels around the application site;
 - noise impact evaluation criteria;
 - prediction of the noise 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 impact;
 - a summary of any residual impacts; and
 - monitoring proposals.

Consultations / Consultees

- 10.12 A pre-planning consultation meeting was held between officials of Wicklow County Council and representatives of Kilsaran Concrete and SLR Consulting Ireland on 7th February 2019 at the offices of Wicklow County Council in Wicklow Town. Staff from the roads, water and environment services departments of Wicklow County Council were also in attendance.
- 10.13 Details of the proposed development were presented at the meeting and issues of potential concern to the Planning Authority were identified and discussed. Although no specific concerns were raised, there was a concern to ensure that any related environmental impacts, including noise would be fully assessed.
- 10.14 Following a review of published development plans and site mapping / surveys, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of noise for the purposes of this assessment. There was however significant consultation with other specialist contributors.
- 10.15 As this development constitutes Strategic Infrastructure Development (SID), a formal consultation exercise was also undertaken with statutory consultees and nearby residents / members of the general public between October and December 2020. Details of these consultations and the feedback obtained therefrom is provided in a separate report submitted in support of the SID application to An Bord Pleanála. Any specific feedback provided in respect of noise is considered and addressed as appropriate in drafting this Chapter of the EIAR.

Contributors / Author(s)

- 10.16 SLR Consulting Ireland undertook the impact assessment presented in this chapter on behalf of Kilsaran Concrete. The lead consultant for the study was Aldona Binchy MSc. Eng PIEMA Environmental Engineering. Baseline noise monitoring for the purposes of this assessment was carried out by BHP Laboratories.

Limitations / Difficulties Encountered

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

REGULATORY BACKGROUND

- 10.18 The following sections describe the main legislative policy requirements in respect of noise associated with the proposed development.
- 10.19 Currently, there is no national or regional legislation which specifically addresses noise from the inert landfill and waste recovery facility. However, there are a number of guidance documents that are relevant in the context of noise action planning.

National Planning Framework

- 10.20 The National Planning Framework (NPF) 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.
- 10.21 The National Planning Framework makes reference to noise in general terms under Section 9.4, *Creating a Clean Environment for a Healthy Society*. It acknowledges that noise is unwanted sound but is an inevitable consequence of everyday life and it becomes a problem when it occurs in the incorrect place or at the incorrect time or on a frequent or recurring basis. 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.
- 10.22 National Planning Framework Objective 65 on noise seeks 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.”*
- 10.23 There are no specific policies relating to noise emissions in the National Planning Framework for extractive industry, inert landfill and/or C&D waste recovery facility activities. The general objective is to facilitate the development while at the same time protect the environment.

Local Planning Policy- Wicklow County Development Plan

- 10.24 The current Wicklow County Development Plan 2016-2022 includes a number of policies and objectives for the planning and sustainable development of the County.
- 10.25 Specifically Policy 9.3.5 Noise Pollution states:
'Noise pollution can be described as unwanted sound that disrupts the activity or balance of our daily lives. There are many sources of noise pollution, most of which are associated with urban development; road, rail and air transport; industrial, neighbourhood and recreational noise. In Ireland, the principal laws relating to noise are set out in Sections 106, 107, and 108 of Part VI of the Environmental Protection Agency (EPA) Act 1992. Under this legislation local authorities or the EPA are empowered to serve a notice requiring measures to be taken to limit or prevent noise. Wicklow County Council also has a role in the issuing of noise conditions as appropriate in planning permissions and in the enforcement of any planning permissions granted.'
- 10.26 The Noise Pollution Objectives identified by the County Development Plan are as follows:
- WE12: To enforce, where applicable, the provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003, and EPA Noise Regulations 2006.
 - WE13: To regulate and control activities likely to give rise to excessive noise (other than those activities which are regulated by the EPA).
 - WE14: To require proposals for new developments with the potential to create excessive noise to prepare a construction and/or operation management plans to control such emissions.
 - WE15: To require activities likely to give rise to excessive noise to install noise mitigation measures to undertake noise monitoring and to provide an annual monitoring audit.

EPA Noise Guidance for Scheduled Activities (NG4)

- 10.27 The Environmental Protection Agency's (EPA) 2016 *'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)'* sets out scope, content, and methodology for scheduled / licensed industrial and waste activities in Ireland.
- 10.28 In accordance with the NG4 guidance, it is necessary to designate the noise environment at each sensitive receptor location as a *'Quiet Area'*, a *'Low Background Noise Area'* or *'Not an Area of Low Background Noise'*. To be categorised as a *'Quiet Area'* the following criteria must be met:
- at least 3km from urban areas with a population > 1,000 people;
 - at least 10km from any urban areas with a population > 5,000 people;
 - at least 15km from any urban areas with a population > 10,000 people;
 - at least 3km from any local industry;
 - at least 10km from any major industry centre;
 - at least 5km from any National Primary Route; and
 - at least 7.5km from any motorway or dual carriageway.
- 10.29 If any of the above criteria are not met, then it is necessary to undertake a baseline noise survey of the existing daytime, evening, and night-time noise environments in order to establish whether the receptor is located in a *'Low Background Noise Area'* or *'Not an Area of Low Background Noise'*.
- 10.30 The noise criteria for these designations are shown in Table 10-1 below. For an area to be designated as an area of low background noise ($L_{AF 90}$), the daytime, evening, and night-time noise limits must all be met.

Table 10-1
NG4 Noise Criteria for Area Designation

DESIGNATION	DAY L _{AF 90} dB	EVENING L _{AF 90} dB	NIGHT L _{AF 90} dB
Low Background Noise Area	≤ 40	≤ 35	≤ 30
Not an Area of Low Background Noise	≥ 41	≥ 35	≥ 31

- 10.31 The procedure outlined in the NG4 Guidance document then sets out a methodology to determine an acceptable noise limit at a receptor location. This noise limit is termed the **noise rating level** (or L_{Ar,T}) and includes, if necessary, a plus 5dB tonal penalty, or a plus 5dB impulsive penalty. If a noise source is both tonal and impulsive however, only one adjustment should be made.
- 10.32 In order to determine whether or not a 5dB tonal penalty should be applied, it is necessary to obtain third octave frequency data of the noise source in question. The NG4 guidance states that:
‘... the time average sound pressure level in the one-third-octave band of interest should exceed the time-average sound pressure levels of both adjacent one-third-octave bands by some constant level difference’. ‘The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third-octave bands:
- 15dB in low-frequency one-third-octave bands (25Hz to 125Hz);
 - 8dB in middle-frequency bands (160Hz to 400Hz); and
 - 5dB in high-frequency bands (500Hz to 10,000Hz).’
- 10.33 In order to determine whether or not a 5dB impulsive penalty should be applied to a noise source, it is necessary to establish whether or not the noise in question may be ‘described as something with a thumping, banging, or impact noise that is clearly audible above everything else.’
- 10.34 The permitted rating noise level in each designated area is shown in Table 10-2.

Table 10-2
NG4 Permitted Rating Noise Levels

DESIGNATION	DAYTIME NOISE CRITERION, dB L _{Ar,T}	EVENING NOISE CRITERION, dB L _{Ar,T}	NIGHT-TIME NOISE CRITERION, dB L _{Ar,T}
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	45.0	40.0	35.0
All Other Areas	55.0	50.0	45.0

British Standard 5228: 2009+A1:2014

- 10.35 British Standard 5228-1:2009+A:2014 *Noise and Vibration Control on Construction and Open Sites*, Part 1: Noise (BS5228) sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities. It can be used to predict noise levels arising from the operations of mineral extraction and associated backfilling / C&D waste recovery activities. BS5228 also sets out tables of sound power levels generated by a wide variety of mobile equipment.
- 10.36 Noise levels generated by site operations and experienced at local receptors will depend upon a number of variables, the most significant of which are:
- the amount of noise generated by plant and equipment being used at the development site, generally expressed as a sound power level;
 - the periods of operation of the plant at the development site, known as the “on-time”;
 - the distance between the noise source and the receptor, known as the “stand-off”;
 - the attenuation due to ground absorption or barrier screening effects; and
 - any reflections of noise due to the presence of hard vertical faces (ie. walls).

Guidelines for Noise Impact Assessment (IEMA)

- 10.37 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.
- 10.38 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 10-3.

Table 10-3
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

- 10.39 The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB 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.

10.40 To determine the overall noise impact, the magnitude and sensitivity Noise Effects Descriptors are presented in Table 10-4.

Table 10-4
Noise Effects Descriptors (IEMA)

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

10.41 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 10-5.

Table 10-5
Relationship between Noise Impact, Effect and Significance (IEMA)

MAGNITUDE (NATURE OF IMPACT)	DESCRIPTION OF EFFECT (ON A SPECIFIC SENSITIVE RECEPTOR)		SIGNIFICANCE
Substantial	Beneficial	<p>Receptor Perception = Marked Change</p> <p>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.</p>	<p>More Likely to be Significant</p> <p>(Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect)</p>
Moderate		<p>Receptor Perception = Noticeable Improvement</p> <p>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.</p>	<p style="text-align: center;">↕</p>
Slight		<p>Receptor Perception = Just Noticeable Improvement</p> <p>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.</p>	
Negligible	N/A = no discernible effect on receptor		Not Significant
Slight	Adverse	<p>Receptor Perception = Non-intrusive</p> <p>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.</p>	<p>Less Likely to be Significant</p> <p>Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect)</p>
Moderate		<p>Receptor Perception = Intrusive</p> <p>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-awaking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.</p>	<p style="text-align: center;">↕</p>
Substantial		<p>Receptor perception = Disruptive</p> <p>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.</p>	
Severe		<p>Receptor Perception = Physically Harmful</p> <p>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.</p>	Significant

Traffic Noise

Design Manual for Roads and Bridges

- 10.42 The Design Manual for Roads and Bridges DMRB (LA 111) considers the following criterion to understand the need for further assessment of traffic generated noise impacts:
- is the project likely cause change in the baseline noise levels of 1dB $L_{A10, 18hr}$ in the do-minimum year compared to do-something opening year;
 - is the project likely cause change in the baseline noise levels of 3dB $L_{A10, 18hr}$ in the do-something future year compared to do-minimum opening year;
 - does the project involve construction of new road links within 600m of noise sensitive receptors;
 - would there be a reasonable stakeholder's expectation that an assessment is undertaken.

Calculation of Road Traffic Noise

- 10.43 The former UK Department of Transport and Welsh Office memorandum Calculation of Road Traffic Noise (CRTN) published in 1988, sets out standard methods and procedures to predict and measure road traffic noise. These procedures were primarily intended to enable entitlement under the UK Noise Insulation Regulations to be determined, but they also provide guidance appropriate to the calculation of traffic noise for more general applications, for example the haulage route under assessment in this EIAR Chapter.
- 10.44 Road traffic noise is predicted and measured in terms of a statistical measure, equivalent to the 10th percentile. Termed the L_{A10} , this measure of noise is equivalent to the noise level exceeded for 10% of the measurement period. Most legislation that refers to road traffic noise uses this noise index over an 18-hour period, from 06:00 hours to 00:00 hours.
- 10.45 However, in this assessment the methodology presented in CRTN cannot be used as the standard states that the calculation algorithms presented in the guidance are not reliable when traffic flows are less than 50 movements per hour (the total number of HGV movements associated with the proposed development is expected to average 30 movements per hour at maximum intake levels).
- 10.46 Therefore, the haul route methodology presented in BS5228-1:2009+A1:2014 will be used when predicting noise levels from HGVs.

BS5228-1:2009+A1:2014

- 10.47 *BS5228-1: Code of practice for noise and vibration control on construction and open sites* : Noise sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities, such as the movement of HGVs along a haul route. The haul route methodology is detailed in section F.2.5 of the standard. It states at Section F.2.5.1 that:
- 10.48 "The prediction of $L_{Aeq, T}$ from mobile plant using a regular route can be used when items of mobile plant pass at a known rate per hour".
- 10.49 The general expression for predicting the noise from the HGVs on a haul route is as follows:
- $L_{Aeq, T} = LWA - 33 + 10\log 10Q - 10\log 10V - 10\log 10d$
- where:
- LWA is the sound power level of the plant, in decibels (dB);
 - Q is the number of vehicles per hour;
 - V is the average vehicle speed, in kilometres per hour (km/h); and
 - d is the distance of receiving position from the centre of haul road, in metres (m).

10.50 The calculated noise level is then corrected to account for reflected sound, the angle of view, and the percentage on time.

Traffic Noise Impact

10.51 When determining the impact of the proposed changes of the haul route it will be necessary to assess the change in noise level.

10.52 The additional HGV movements may increase the ambient noise level. To determine the impact of any change in the ambient noise level the classification of impacts used in short-term traffic noise assessments presented in the *Design Manual Roads and Bridges Volume 11 Section 3 Part 7 Noise and Vibration* will be used. The impact scale to be used in this assessment is shown in Table 10-6.

Table 10- 6
Change in Average/Ambient Noise– Noise Impact

NOISE IMPACT	$L_{Aeq,T}$ dB NOISE CHANGE
None	0.0
Minor	0.1 – 2.9
Moderate	3.0 – 4.9
Major	5.0 +

Guidance on Effects of Industrial Noise on Wildlife

10.53 AQTAG09 (Air Quality Technical Advisory Group 09) guidance published by the UK Environment Agency provides guidance to assist planning and/or licensing officials handling pollution prevention and control applications for industrial installations on relevant noise emissions and relates these to requirements of Habitats Regulations.

10.54 The Habitats Directive (92/43/EEC) specifies that, where specific noise from industry, measured at the habitat / nest site is below the levels in Table 10-7, it is considered unlikely that it will have an adverse impact on designated species. Where noise levels are exceeded, a more detailed noise assessment will be required.

Table 10-7
Specific Noise Levels at Habitat Site

PARAMETER	NOISE LEVEL, dB
$L_{Amax,F}$	80
$L_{Aeq,1hr}$	55

NOISE AND HUMAN HEALTH

10.55 Environmental noise exposure response relationships and thresholds for health endpoints for industry are not available at European or Irish level in legislation or guidelines.

WHO Environmental Noise Guidelines

10.56 World Health Organisation (WHO) Europe have produced the WHO Environmental Noise Guidelines 2018 for the European Region as a regional update to WHO Community Noise Guidelines. The Guidelines include a review of evidence on health effects of environmental noise to incorporate significant research carried out in recent years. The guidelines provide recommendations for protecting human health from exposure to environmental noise from various sources and provide assessments of several such sources including aircraft, rail, road, wind turbines and leisure noise.

10.57 The 2002 EU Directive introduced annual average indicators of noise exposure (L_{den} and L_{night}) as long-term exposure indicators, which differ from those used in earlier WHO Guidelines for Community Noise (1999).

RECEIVING ENVIRONMENT

Study Area

10.58 The application site and Kilsaran property holding at Ballinclare Quarry straddles two townlands, Ballinclare and Carrigmore. The overall landownership area is c.36 ha (89 acres). The application area for the purposes of this development is 32.5ha (78.3 acres) as it excludes a compound / yard area leased to Wicklow County Council in the north-western corner of the landholding.

10.59 The application area extends across all of the former quarry footprint and includes the former concrete / asphalt production area, the recently installed concrete block yard, established site buildings and infrastructure and the area around the existing system of settling ponds in the north-western corner.

10.60 The area surrounding the application site is typically rural in character and dominated by forestry and undulating agricultural land. Ground level in the vicinity generally lies between 60mOD and 70mOD. Potters River flows approximately 450m beyond the northern boundary of the application and then turns south-eastwards to flow approximately 250m to the east of the property. Thereafter it continues south-eastward and eventually discharges to the sea at Brittas Bay.

10.61 Residential property in the vicinity of the application site generally comprises farmsteads and isolated / one off houses along the local road network. The nearest dwellings to the landholding site boundary are those located to the south, west and north of the site, along the local county road network, and are identified in Figure 10-1. The lands surrounding the existing quarry comprise farm fields, forestry and existing quarry / industrial lands. The Kilmacurragh Botanic Gardens are located just under 1km to the south-west of the site.

10.62 Neither the application site nor any lands immediately adjoining are subject to any statutory or non-statutory nature conservation designation. Deputy's Pass Nature Reserve Special Area of Conservation (SAC, Site Code 000717) is located approximately 1.6km to the north-west of the application site, while Glenealy Woods proposed Natural Heritage Area (pNHA, Side Code 001756) is located approximately 1.0km to the north-west

Sources of Information

10.63 Baseline information was gathered through a combination of desk-based study, site visit, and technical assessments consistent with current standard methodologies and published best practice guidelines. This provided relevant data to allow an assessment of likely significant effects of the proposed development on sensitive receptors within its zone of influence.

Baseline Study Methodology

10.64 Environmental noise surveys were carried out to capture typical background noise levels at the noise-sensitive receptors closest to the application site. The methodology of the surveys and the results are set out below. The weather conditions during the survey periods were acceptable for noise monitoring, being generally dry with little or no wind.

10.65 The measurements were carried out using a Larson Davis 812 Type 1 sound level meter. The sound level meter was calibrated before the measurements, and its calibration checked after, using a field calibrator. No calibration drifts were found to have occurred during surveys. All noise equipment had been calibrated to a traceable standard by UKAS (United Kingdom Accreditation Service) accredited laboratories within 24 months preceding the surveys.

10.66 At the measurement positions, the following noise level indices were recorded:

- $L_{Aeq, T}$ is the A-weighted equivalent continuous noise level over the measurement period (T), and effectively represents an “average” value.
- $L_{A90, T}$ is the A-weighted noise level exceeded for 90% of the measurement period (T). This parameter is often used to describe the background noise.
- $L_{A10, T}$ is the A-weighted noise level exceeded for 10% of the measurement period (T). This parameter is often used to describe traffic noise.

10.67 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 20µPa.

10.68 Environmental noise surveys were undertaken by BHP Laboratories at the nearest noise sensitive receptors to the application site on 23rd April 2019. Monthly noise measurements were undertaken at each location over a 30-minute period during daytime hours (07:00 to 19:00) each month between April and October 2019.

10.69 During the surveys, the sound level meter was located in free-field conditions (i.e. at least 3.5m from the nearest vertical reflecting surface, with the microphone approximately 1.5m above ground level).

Field Survey / Monitoring

10.70 The noise monitoring locations used for the purposes of the baseline noise survey, shown in Figure 10-1, comprise the following :

- N1 at the north-western corner of the site;
- N2 at the south-eastern corner of the site;
- N3 to the south-western corner of the site.

10.71 The baseline noise monitoring locations listed above are considered representative of the nearest noise sensitive locations (receptors) to the application site, as described below:

- Location N1 is considered representative of residential properties located to the north of application site.
- Location N2 is considered representative of residential properties to the south-east of the application site.
- Location N3 is considered representative of the residential properties located to the south west of the application site.

10.72 Noise monitoring results for the monthly baseline survey are provided in Table 10-8. Logarithmic average L_{Aeq} values are provided in Table 10-9.

Table 10-8
Summary of Measured Noise Levels, Free Field dB

LOCATION	DATE	TIME	$L_{Aeq,T}$	L_{A90}	L_{A10}
N1	23/04/2019	12:52	43	38	46
N1	28/05/2019	13:58	41	27	43
N1	10/06/2019	18:02	45	36	49
N1	04/07/2019	09:50	40	29	44
N1	07/08/2019	09:32	45	36	48
N1	04/09/2019	11:52	45	36	48
N1	3/10/2019	10:05	53	43	57
N2	23/04/2019	13:32	44	38	47
N2	28/05/2019	14:37	50	41	51
N2	10/06/2019	18:41	42	38	45
N2	04/07/2019	10:00	41	34	41
N2	07/08/2019	09:10	44	38	45
N2	04/09/2019	11:21	44	38	45
N2	3/10/2019	10:08	54	48	56
N3	23/04/2019	13:05	43	38	46
N3	28/05/2019	14:03	39	28	43
N3	10/06/2019	17:44	43	37	49
N3	04/07/2019	10:26	39	28	40
N3	07/08/2019	09:44	44	37	49
N3	04/09/2019	11:55	45	37	49
N3	3/10/2019	10:12	51	48	55

Table 10-9
Summary of Measured Noise Levels (Averaged)

LOCATION	RECEPTORS	PERIOD	L _{AEQ} AVGE
N1	R7 to R11	Daytime	46
N2	R12, R13	Daytime	48
N3	R1 to R6	Daytime	45

Sensitive Receptors

Ecological Receptors

- 10.73 Based on the nature, size and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 and designated sites is up to a maximum radius of 2km from the application site unless there are any potential source-pathway-receptor links between the proposed development at Ballinclare and any Natura 2000 and designated site(s) beyond this distance.
- 10.74 There is one designated Natura 2000 and one pNHA site within a 2km radius of the application site at Ballinclare Quarry. These sites are identified in Table 10-10 below.

Table 10-10
Natura 2000 and designated sites within a 2km of the Application Site

NATURA 2000 SITE	SITE CODE	LOCATION AT CLOSEST POINT TO THE SITE (m)
Deputy's Pass Nature Reserve SAC	000717	1600
Glenealy Woods pNHA	001756	1100

- 10.75 As the Glenealy Woods SAC pNHA and Deputy's Pass Nature Reserve SAC lie within the potential zone of influence of the proposed development, they have both been deemed as relevant and have been screened-in for the purposes of this noise assessment.

Human Receptors

- 10.76 Sensitive locations are those where people may be exposed to noise from the existing or planned activities. The closest residential receptors to the application site have been identified on the basis of their distance from the application site boundary. This is a cautious approach, as noise generating activities will generally be located at greater distances within the application site. The relevant receptors are listed in Table 10-11 below and their locations are shown in Figure 10-1.

Table 10-11
Sensitive Receptors

RECEPTOR REFERENCE	RECEPTOR	SENSITIVITY	DISTANCE (m) FROM C&D CRUSHING ACTIVITIES	DISTANCE (m) FROM SOIL WASHING ACTIVITIES	DISTANCE (m) FROM INERT SOIL WASTE DEPOSITION ACTIVITIES
R1	Residential	Medium	420	720	540
R2	Residential	Medium	490	800	620
R3	Residential	Medium	550	850	675
R4	Residential	Medium	680	975	800
R5	Residential	Medium	660	960	790
R6	Residential	Medium	800	910	1090
R7	Residential	Medium	580	850	352
R8	Residential	Medium	490	740	210
R9	Residential	Medium	430	650	120
R10	Residential	Medium	520	425	200
R11	Residential	Medium	560	600	360
R12	Residential	Medium	780	540	360
R13	Residential	Medium	540	300	240
Kilmacurragh Arboretum	Tourist / Amenity	Medium	870	1040	920
Forest to North	Amenity	Medium	350	330	50

Traffic Sensitive Receptors

10.77 Traffic sensitive receptors are identified in Table 10-12 below.

Table 10- 12
Traffic Sensitive Receptors

LOCATION
Residential Properties on L113 - 1
Residential Properties on L113 – 2
Residential Properties in Carrigmore
Residential Properties in Ballinclare

IMPACT ASSESSMENT

Evaluation Methodology

- 10.78 To determine the noise impact arising from activities at the proposed facility, SLR Consulting Ireland carried out a noise prediction assessment, whereby resultant noise levels were calculated at the noise sensitive receptors (residences) shown on Figure 10-1.
- 10.79 Operational $L_{Ar, 1hr}$ noise predictions at each receptor location are based on BS5228: Part 1 (2009)+ A1:2014 “Code of Practice for Noise and Vibration Control on Construction and Open Sites”
- 10.80 For the purposes of this assessment, the following noise sources have been considered in the noise assessment for the landfilling and C&D waste recovery operations :
- Dozer;
 - Hydraulic Excavator;
 - HGV truck;
 - C&D tracked crusher;
 - Soil washing plant.
- 10.81 Noise generated by soil and stone intake and backfilling activities will for the most part, be screened by surrounding land forms, and by the existing quarry faces in particular and the difference in elevation along the attenuation path as a result will be greater than 1.5m. For the purposes of this noise impact assessment, a reduction of -15 dB(A) has been assumed for partial noise screening by existing quarry faces and by the vegetated perimeter mounds and berms.
- 10.82 As it is also proposed to erect a dedicated recycling shed at the facility and that all C&D waste crushing / processing will be undertaken internally, within the proposed shed unit, a further noise reduction of -22 dB(A) (BS 8233: 1999) has been assumed for full noise screening of waste crushing activities by the external shed cladding.
- 10.83 For the purposes of this assessment, it is assumed that all of the noise sources are active and arise continuously and simultaneously during permitted working hours and that the attenuation distance to the selected closest receptors is calculated from the noise source (as indicated in Figure 10-1). On the basis of the methodology outlined above, it is considered that the noise impact assessment presented herein is sufficiently robust and conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in Appendix 10-B.

Operational Activities

- 10.84 The updated Environmental Noise Standard ISO as set out in Annex D, 1996-2:2007(E) details that a prominent, discrete tonal component may be detected in one-third octave spectra if the level of a one-third octave band exceeds the level of the adjacent bands by some constant level difference.
- 10.85 The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third-octave bands:
- 15dB in low-frequency one-third-octave bands (25Hz to 125Hz);
 - 8dB in middle-frequency bands (160Hz to 400Hz), and;
 - 5dB in high-frequency bands (500Hz to 10,000Hz).
- 10.86 The noise characteristics of the plant and equipment to be used for the proposed backfilling / landfilling and C&D waste recovery activities at Ballinclare Quarry and considered in this noise assessment are shown in Table 10-13.

Table 10-13
Octave Band Noise Spectra for Plant to be used in Assessment

PLANT	OCTAVE BAND SOUND PRESSURE LEVELS @ 10m, Hz								L _{A eq} @10m
	63	125	250	500	1k	2k	4k	8k	
EXCAVATOR	72	71	74	73	69	66	63	58	75
HGV	80	76	73	70	69	66	63	58	74
DOZER	79	77	76	74	68	67	60	59	75
TRACKED CRUSHER	93	86	79	81	75	71	66	59	82
SOIL WASHING PLANT									79

- 10.87 The plant and equipment used at the facility will not generate impulsive or tonal noise within the frequency range. As such, no penalty was added to the predicted operational L_{Ar, 1hr} noise level for presence of tonal or impulsive noise.
- 10.88 The operational L_{Ar, 1hr} noise prediction for each receptor location is presented in Table 10-14 below. Table 10-14 also shows the comparison between the predicted operational L_{Ar, 1hr} noise level and the prescribed noise limit (from the EPA’s NG4 guidelines) for ‘all other areas’ at each receptor.

Table 10-14
Operational Noise Levels : Proposed Waste Facility

RECEPTORS	PERIOD	NOISE LIMIT L _{A eq, 1hr} dB(A)	OPERATIONAL* L _{Ar, 1hr} dB(A)	DIFFERENCE
R1	Daytime	55.0	35	-20
R2	Daytime	55.0	34	-21
R3	Daytime	55.0	33	-22
R4	Daytime	55.0	32	-23
R5	Daytime	55.0	32	-23
R6	Daytime	55.0	30	-25
R7	Daytime	55.0	37	-18
R8	Daytime	55.0	41	-14
R9	Daytime	55.0	46	-9
R10	Daytime	55.0	42	-13
R11	Daytime	55.0	38	-17
R12	Daytime	55.0	38	-17
R13	Daytime	55.0	42	-13

RECEPTORS	PERIOD	NOISE LIMIT $L_{A\text{ eq, 1hr}}$ dB(A)	OPERATIONAL* $L_{Ar, 1hr}$ dB(A)	DIFFERENCE
Kilmacurragh Arboretum	Daytime	55.0	31	-24
Forest to North	Daytime	55.0	54	-1

* Operational Noise Level= Predicted Noise Level without a 5 dB penalty

10.89 As can be seen from the table above, the EPA NG4 daytime noise criterion limits arising specifically from waste disposal and recovery activities at Ballinclare Quarry are satisfied at all nearby noise sensitive locations.

10.90 To identify the potential impact of activities at the proposed waste facility, the predicted $L_{Aeq, 1hr}$ dB(A) noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels at each of the noise sensitive locations for each time-period. The cumulative assessment is presented in Table 10-15 below.

Table 10-15
Cumulative Operational Noise Levels : Proposed Waste Facility

RECEPTORS	PERIOD	EXISTING BASELINE $L_{Aeq,T}$ dB(A)	OPERATIONAL $L_{Ar, 1hr}$ dB(A)*	CUMULATIVE $L_{Aeq, T}$ dB(A)	DIFFERENCE	SHORT TERM IMPACT	LONG TERM IMPACT
R1	Daytime	45	35	45	0	Negligible	Negligible
R2	Daytime	45	34	45	0	Negligible	Negligible
R3	Daytime	45	33	45	0	Negligible	Negligible
R4	Daytime	45	32	45	0	Negligible	Negligible
R5	Daytime	45	32	45	0	Negligible	Negligible
R6	Daytime	45	30	45	0	Negligible	Negligible
R7	Daytime	45	37	47	+1	Minor	Negligible
R8	Daytime	46	41	47	+1	Minor	Negligible
R9	Daytime	46	46	49	+3	Moderate	Minor
R10	Daytime	46	42	48	+2	Minor	Negligible
R11	Daytime	46	38	47	+1	Minor	Negligible
R12	Daytime	48	38	48	0	Negligible	Negligible
R13	Daytime	48	42	49	+1	Minor	Negligible

*Operational Noise Level = Predicted Noise Level

- 10.91 With reference to the *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative short-term noise impact from recommencement of activity at Ballinclare is determined ***in a worst case scenario*** to be ***minor*** at R7 and R8, R10, R11, R13 and ***moderate*** at R9. The noise impact at all other receptors located at a greater distance is determined to be negligible.
- 10.92 With reference to the *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative long-term noise impact from the landfilling and C&D waste recovery operations is determined ***in a worst case scenario*** to be ***negligible*** at all receptors but ***minor*** at R9. The noise impact at all other receptors located at a greater distance is determined to be negligible.
- 10.93 Due to the separation distance, the noise impact at Kilmacurragh Arboretum is assessed to be negligible.
- 10.94 In view of the above findings, it is considered that it is appropriate to implement a number of mitigation measures to further manage / reduce noise related impacts of plant associated with planned future waste activities at Ballinclare Quarry.

Ecological Receptors

- 10.95 Ecological receptors of concern are those areas designated under EU Habitats Directive (92/43/EEC). Neither the application site nor any lands immediately adjoining it are subject to any statutory nature conservation designation.
- 10.96 Based on the nature, size and scale of the planned development / intensification, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 sites is up to a maximum radius of 2km from the application site unless there are any potential source-pathway-receptor links between the facility and any Natura 2000 site(s) beyond this distance.
- 10.97 At a distance greater than 2km, and in the absence of any potential source-pathway-receptor link, it is considered that no Natura 2000 sites would be affected by any direct loss of habitat or impacted upon by the effects of noise.
- 10.98 The nearest designated nature sites to Ballinclare Quarry are located at Glenealy Woods pNHA, approximately 1.1km away and at Deputy’s Pass Nature Reserve SAC approximately 1.6km away. The operational $L_{Ar, 1hr}$ noise prediction for these two ecological receptor locations is presented in Table 10-16 below. Table 10-16 also presents a comparison between predicted operational $L_{Ar, 1hr}$ noise levels and the prescribed noise limit for protection of wildlife.

Table 10- 16
Operational Noise Levels at Ecological Receptors : Proposed Waste Facility

RECEPTORS	PERIOD	NOISE LIMIT $L_{A eq, 1hr}$ dB(A)	OPERATIONAL * $L_{A eq, 1hr}$ dB(A)	DIFFERENCE
Deputy’s Pass Nature Reserve SAC	Daytime	55.0	29	-26
Glenealy Woods pNHA	Daytime	55.0	26	-29

*Operational Noise Level = Predicted Noise Level without the 5 dB penalty

- 10.99 As can be seen from the table above, the noise criterion limits for protection of wildlife arising specifically from proposed facility activity are comfortably achieved at both of the nearest ecological noise sensitive locations.

Post Operational Phase

10.100 The post operational phase of the proposed development will include some site based activity to establish grassland cover and decommission any remaining plant and services. Potential noise impacts associated with the remedial phase of the proposed development will be negligible.

Traffic Assessment

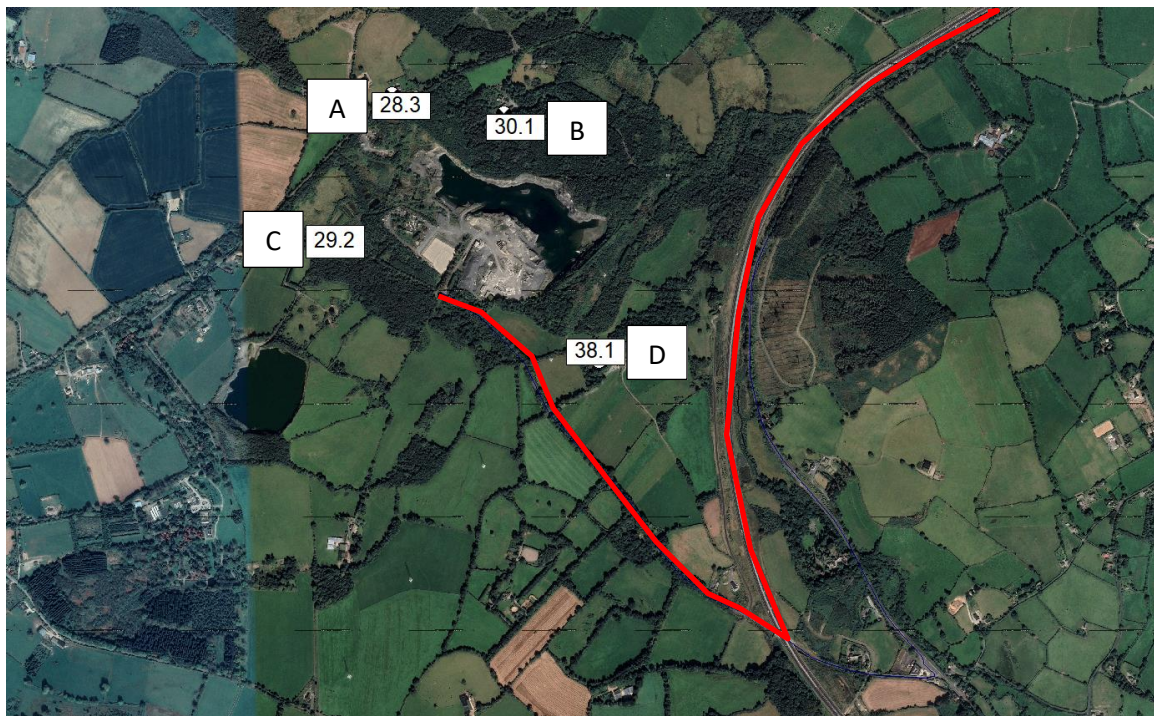
Predicted HGV Sound Levels

10.101 The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, CadnaA®, which implements the full range of calculation methods. The calculation algorithms set out in BS5228-1:2009+A1:2014 have been used and the following parameters have been set:

- A ground absorption factor of 0.5 (representing hard ground);
- A reflection factor of 2;
- A line source with 30 HGV movements per hour, moving at 48km/hr;
- A HGV sound power level of 96dB(A); A HGV source height of 1.5m.
- A receiver height of 1.5m;
- A noise level at 3.5m from the façade of the property.

10.102 Plate 10-1 below presents the noise model in CadnaA including the re-route of the HGVs trips to and from the application site (highlighted in red) and the location of the surrounding receptor properties which have been assessed (identified as properties A to D) .

Plate 10- 1
CadnaA Traffic Modelling



10.103 Topographical data has not been taken into account. The calculated sound level of additional HGV movements at the four receptor locations assessed by modelling is shown in Table 10 -17

Table 10- 17
Calculated Noise Level of Additional HGVs, free field, dB

LOCATION	DAYTIME $L_{Aeq,T}$
(A) Residential Properties on L113 - 1	28.3
(B) Residential Properties on L113 – 2	30.1
(C) Residential Properties in Carrigmore	29.2
(D) Residential Properties in Ballinclare	38.1

Change in the Ambient Noise Level Assessment

10.104 To determine the worst-case increase in the ambient noise level at each receptor, it is necessary to logarithmically add the calculated specific sound level of the re-routed HGVs, to the ambient noise level measured during the quietest period as shown in Table 10-8. The results of this calculation and the difference between the cumulative ambient noise level and the baseline ambient noise level are also shown in Table 10-18 below.

Table 10- 18
Worst Case Increase in the Ambient Noise Level, free-field, dB

LOCATION	PERIOD	QUIETEST $L_{Aeq,T}$ NOISE LEVEL	CALCULATED $L_{Aeq,T}$ of ADDITIONAL HGVs	CUMULATIVE $L_{Aeq,T}$ NOISE LEVEL	INCREASE IN THE $L_{Aeq,T}$ NOISE LEVEL	IMPACT
(A) Residential Properties on L113 - 1	Daytime	40	28.3	40.8	0.3	Minor
(B) Residential Properties on L113 – 2	Daytime	40	30.1	40.8	0.4	Minor
(C) Residential Properties in Carrigmore	Daytime	39	29.2	40.2	0.4	Minor
(D) Residential Properties in Ballinclare	Daytime	41	38.1	45.1	1.8	Minor

10.105 As can be seen from Table 10-18 above, during the daytime, the worst-case impact is assessed as minor. This level of impact would not be considered to be significant.

Unplanned Events (i.e. Accidents)

10.106 Accidents, malfunctions and unplanned events refers to events or upset conditions that are not part of any activity or normal operation of the proposed inert waste disposal and recovery activities planned by the Applicant. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during the proposed waste activities.

- 10.107 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of noise impacts, the only unplanned event likely to have an effect on the local area would be a malfunction of plant or equipment or possibly a vehicle collision. .
- 10.108 In relation to noise impact of any unplanned events, any are considered to be short term and negligible, with no potential to increase noise levels at sensitive receptors.

Interaction with Other Impacts

- 10.109 The potential impact of noise generated by the proposed waste activities on sensitive receptors including sensitive ecological receptors and people living in the area 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 Chapter 5 'Biodiversity'.

'Do Nothing' Scenario

- 10.110 Given the proximity of the quarry to the local road infrastructure, ambient noise levels from road traffic are considerably elevated and will tend to dominate other noise sources. Locally, barking dogs and agriculture activities are also audible.
- 10.111 Over time, it is anticipated that the volume of road traffic, in the area will increase as economic activity increases and that this in turn is likely to lead to a gradual, likely audible increase in ambient and background noise levels.

MITIGATION MEASURES

- 10.112 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. The adoption of Best Practicable Means is generally considered to be the most effective means of controlling noise emissions.
- 10.113 Notwithstanding the findings of the impact assessment presented above, which determined that the proposed landfilling and C&D waste recovery activities at Ballinclare Quarry will have negligible to minor long-term noise impact, and in line with practice at other Kilsaran facilities, the following best practice measures will be implemented wherever practicable at the waste facility to further reduce the potential noise impact of on-site activities:

Phasing

- Landfilling / quarry backfilling operations will be carried out on a phased basis, commencing at the western side of the site (and will therefore be of limited duration and at greater distance than has been assumed for worst-case noise modelling purposes).

Screening

- Existing screening berms and screen planting around the planned facility will be retained to act as acoustic barriers. Berms and landscaping should be inspected on a regular basis and maintained and/or strengthened as necessary.

Plant

- All mobile plant used at the development will have noise emission levels that comply with the limiting levels defined in EC Directive 2000/14/EC and any subsequent amendments thereof;

- All plant items will be properly maintained and operated according the manufacturers' recommendations, in such a manner as to avoid causing excessive noise (i.e. all moving parts are kept well lubricated, all cutting edges are kept sharpened, the integrity of silencers and acoustic hoods are maintained);
- All plant will be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers will be replaced immediately.

Traffic

- All deliveries will be programmed to arrive during working hours only. Care should be taken when unloading vehicles to reduce or minimise potential disturbance to local residents.
- Traffic speed within the facility will be limited / controlled;
- Access / internal haul roads will be kept clean and maintained in a good state of repair, i.e. any potholes are filled, and large bumps removed, to avoid unwanted rattle and "body-slap" from heavy goods vehicles.
- Delivery vehicles waiting within the facility will be prohibited from leaving their engines running and there should be no unnecessary revving of engines.

10.114 Experience from other facilities has shown that by implementing these measures, typical noise levels from construction works and/or recovery operations can bring about a further small reduction of up to 5dB(A) in ambient noise levels.

RESIDUAL IMPACT ASSESSMENT

10.115 The worst-case noise assessment has shown that in accordance with the scale in the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA) the cumulative long-term noise impact from plant associated with the development is **negligible** at all receptors within 500m of the application site boundary with the exception of R9, where it is assessed to be **minor**. At all other receptors at greater distance, the noise impact is determined to be negligible.

10.116 Table 10-19 summarises the impacts and mitigation measures for operational plant noise at each of the noise sensitive receptor considered.

Table 10- 19
Residual Noise Summary Table

RECEPTORS	INCREASE IN OPERATIONAL	IMPACT WITHOUT MITIGATION MEASURES		MITIGATION	REDUCTION IN NOISE FROM OPERATIONAL	INCREASE IN OPERATIONAL	RESIDUAL SHORT-TERM IMPACT	RESIDUAL LONG-TERM IMPACT
		SHORT TERM	LONG TERM					
R1	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R2	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R3	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R4	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible

RECEPTORS	INCREASE IN OPERATIONAL	IMPACT WITHOUT MITIGATION MEASURES		MITIGATION	REDUCTION IN NOISE FROM OPERATIONAL	INCREASE IN OPERATIONAL	RESIDUAL SHORT-TERM IMPACT	RESIDUAL LONG-TERM IMPACT
		SHORT TERM	LONG TERM					
R5	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R6	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R7	+1	Minor	Negligible	Short-term Required	-5	0	Negligible	Negligible
R8	+1	Minor	Negligible	Short-term Required	-5	0	Negligible	Negligible
R9	+3	Moderate	Minor	Required	-5	0	Negligible	Negligible
R10	+2	Minor	Negligible	Short-term Required	-5	0	Negligible	Negligible
R11	+1	Minor	Negligible	Short-term Required	-5	0	Negligible	Negligible
R12	0	Negligible	Negligible	Not Required	-5	0	Negligible	Negligible
R13	+1	Minor	Negligible	Short-term Required	-5	0	Negligible	Negligible

Cumulative / Synergistic Impacts

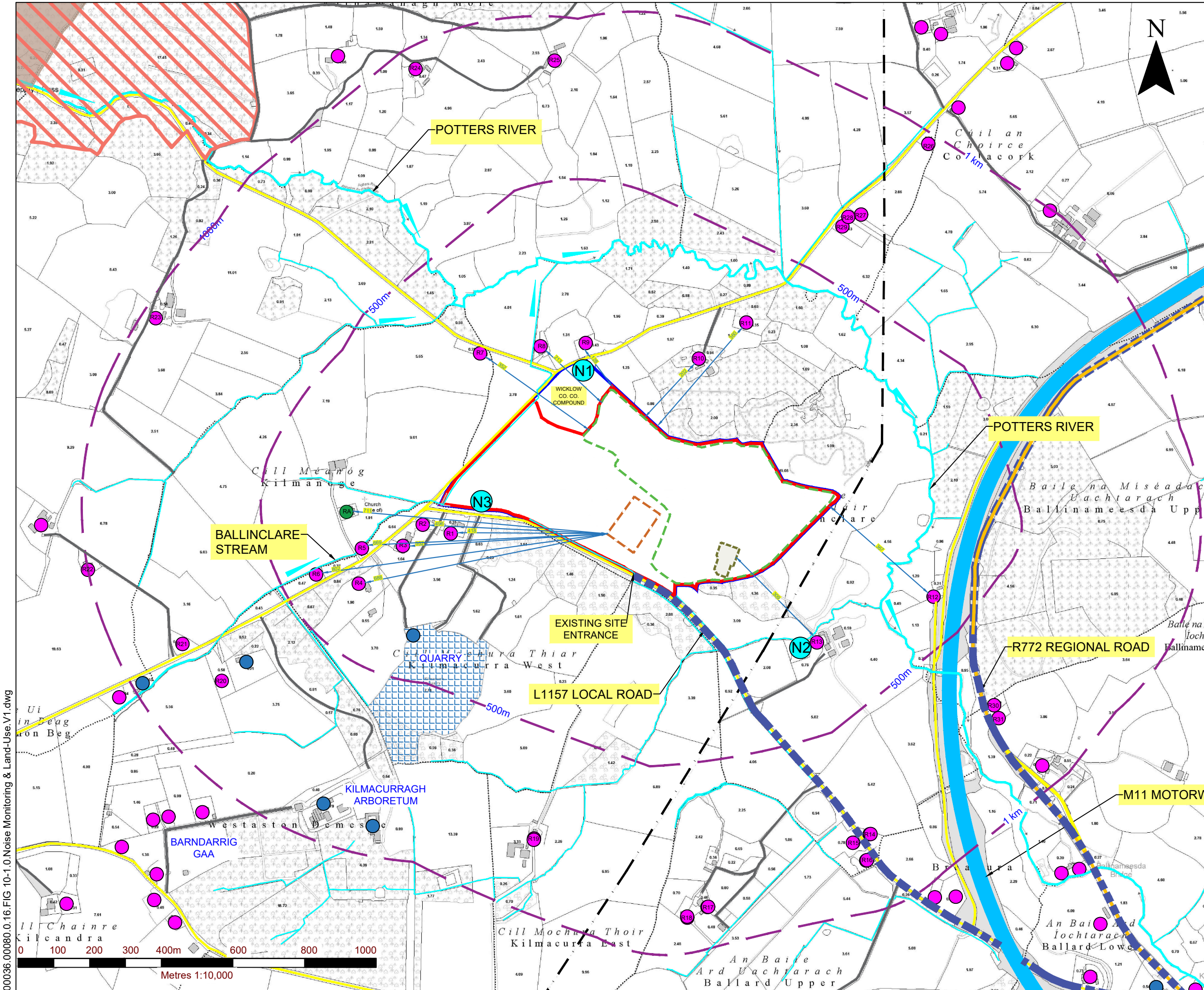
- 10.117 In essence, cumulative impacts are those which result from incremental changes caused by past or pre-existing development or actions, together with those generated by the proposed development plus any other reasonably foreseeable development / actions. Therefore the proposed development cannot be considered in isolation but must be considered in addition to impacts already extant and/or arising from existing or planned future development.
- 10.118 The noise impact assessment presented herein indicates that the long-term residual noise impact from the proposed waste activities at Ballinclare Quarry is negligible at all except one local residential receptor and minor at one residential property to the north of the quarry.
- 10.119 A search of the www.myplan.ie website and An Bord Pleanála online planning portal was carried out to determine if there were any other planned developments in the vicinity (c. 1km radius) of the application site that have recently been granted permission or are currently under consideration and which have the potential to have a significant adverse cumulative impact on the local environment.
- 10.120 There is no other major planned development in the vicinity of the existing quarry at Ballinclare. Notwithstanding this, this assessment indicates that the noise impacts arising from the proposed backfilling and recovery activities are negligible to minor at all potentially sensitive receptors and as such do not have the potential to adversely increase noise levels in the local area, either on their own or in combination with other development.

MONITORING

10.121 Noise monitoring will be undertaken around the application site. Noise monitoring locations shall be reviewed and revised where and as/when necessary. The results of the noise monitoring shall be submitted to Wicklow County Council and/or EPA on a regular basis for review and record purposes following commencement of landfilling and waste recovery activities.

FIGURES

Figure 10-1: Local Receptors



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 1:2,500 / 1:5,000 MAP SERIES: 4077-D, 4078, 4078-D, 4079-C, 4136, 4137, 4137-B, 4137-D, 4138-A & 4138-C

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

LEGEND

	LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
	PLANNING APPLICATION AREA (c. 32.5 Ha.)
	INERT WASTE LANDFILL FOOTPRINT (c. 17.0 Ha.)
	C&D WASTE RECOVERY FACILITY AREA
	PROPOSED WASHING PLANT
	500m & 1km DISTANCE OFFSETS FROM BOUNDARY
	RESIDENTIAL RECEPTORS
	COMMERCIAL RECEPTORS
	002274 - DEPUTY'S PASS NATURE RESERVE SAC
	001756 - GLENEALY WOODS pNHA
	R772 REGIONAL ROAD
	LOCAL ROAD NETWORK
	ACCESS TRACKS
	220kV ELECTRIC OVERHEAD LINE
	RIVER / STREAMS
	NOISE MONITORING LOCATIONS

SLR global environmental solutions

SLR CONSULTING IRELAND
7 DUNDUM BUSINESS PARK
WINDY ARBOUR
DUBLIN 14
T: +353-1-2964667
F: +353-1-2964676
www.slrconsulting.com

KILSARAN CONCRETE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

BALLINCLARE QUARRY RESTORATION & INERT WASTE & C+D WASTE RECOVERY FACILITY KILBRIDE (N11), CO. WICKLOW

NOISE MONITORING LOCATIONS & LAND USE RECEPTORS

FIGURE 10-1

Scale: 1:10,000 @ A3 Date: MARCH 2021

00036.00080.0.16.FIG 10-1.0.Noise Monitoring & Land-Use.V1.dwg

APPENDIX 10-A

GLOSSARY OF TERMINOLOGY

In order 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. In order 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 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10A
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

Acoustic Terminology

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 (2×10^{-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 of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L₁₀ & L₉₀ 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, L₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L₉₀ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L₁₀ index to describe traffic noise.

- L_{AF10} , L_{AF90} Noise levels as above measured using the 'fast' time weighting
- 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.
- $L_{Amax,F}$, The maximum A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
- $L_{Ar, T}$ The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.
- L_{den} The 24 hour noise rating level determined by the averaging of the L_{day} with the $L_{evening}$ plus a 5 dB penalty and the L_{night} plus a 10 dB penalty. L_{den} is calculated using the following formula:

$$L_{den} = 10 \log \left(\frac{1}{24} \right) \left(12 * \left(10^{\frac{L_{day}}{10}} \right) + 4 * \left(10^{\frac{Levening+5}{10}} \right) + 8 * \left(10^{\frac{Lnight+10}{10}} \right) \right)$$

Where: -

L_{day} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the day periods of a year;

$L_{evening}$ is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year and; -

L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year.

APPENDIX 10-B NOISE CALCULATIONS

Activity	Receptor	Activity L _{Aeq} (dB) at 10m Distance					Reflection d(B(A))	Screening d(B(A))	Cladding d(B(A))	Activity Distance (m)					Noise Attenuated with Distance dB(A)					Activity L _{Aeq} (dB)					Operational Noise Levels d(B(A))
		Excavator	HGV	Dozer	Tracked Crusher	Soil Washing Plant				Excavator	HGV	Dozer	Tracked Crusher	Soil Washing Plant	Excavator	HGV	Dozer	Tracked Crusher	Soil Washing Plant	Excavator	HGV	Dozer	Tracked Crusher	Soil Washing Plant	
INERT LANDFILL / C&D WASTE RECOVERY FACILITY	R 1	75	74	75	82	79	3	-15	-20	540	540	540	410	720	-35	-35	-35	-32	-37	28	27	28	18	30	35
	R2	75	74	75	82	79	3	-15	-20	620	620	620	490	800	-36	-36	-36	-34	-38	27	26	27	16	29	34
	R3	75	74	75	82	79	3	-15	-20	675	675	675	550	850	-37	-37	-37	-35	-39	26	25	26	15	28	33
	R4	75	74	75	82	79	3	-15	-20	800	800	800	680	975	-38	-38	-38	-37	-40	25	24	25	13	27	32
	R5	75	74	75	82	79	3	-15	-20	790	790	790	660	960	-38	-38	-38	-36	-40	25	24	25	14	27	32
	R6	75	74	75	82	79	3	-15	-20	1090	1090	1090	800	910	-41	-41	-41	-38	-39	22	21	22	12	28	30
	R7	75	74	75	82	79	3	-15	-20	350	350	350	580	850	-31	-31	-31	-35	-39	32	31	32	15	28	37
	R8	75	74	75	82	79	3	-15	-20	210	210	210	490	740	-26	-26	-26	-34	-37	37	36	37	16	30	41
	R9	75	74	75	82	79	3	-15	-20	120	120	120	430	650	-22	-22	-22	-33	-36	41	40	41	17	31	46
	R10	75	74	75	82	79	3	-15	-20	200	200	200	520	425	-26	-26	-26	-34	-33	37	36	37	16	34	42
	R11	75	74	75	82	79	3	-15	-20	360	360	360	560	600	-31	-31	-31	-35	-36	32	31	32	15	31	38
	R12	75	74	75	82	79	3	-15	-20	360	360	360	780	540	-31	-31	-31	-38	-35	32	31	32	12	32	38
	R13	75	74	75	82	79	3	-15	-20	240	240	240	540	309	-28	-28	-28	-35	-30	35	34	35	15	37	42
	pNHA	75	74	75	82	79	3	-15	-20	1100	1100	1100	1100	1100	-41	-41	-41	-41	-41	22	21	22	9	26	29
	SAC	75	74	75	82	79	3	-15	-20	1600	1600	1600	1600	1600	-44	-44	-44	-44	-44	19	18	19	6	23	26
	Kilmacurragh	75	74	75	82	79	3	-15	-20	920	920	920	870	1040	-39	-39	-39	-39	-40	24	23	24	11	27	31
Forest to N	75	74	75	82	79	3	-15	-20	50	50	50	350	330	-14	-14	-14	-31	-30	49	48	49	19	37	54	