Contents

Tables

Figures

Introduction

Background

10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland on behalf of BD Flood Unlimited Company (BD Flood), addresses the potential noise and vibration effects of a proposed new sand and gravel extraction development at Derryarkin townland, Croghan, Rhode, Co. Offaly.

10.2 The proposed development being applied for under this current planning application is shown on EIAR **Figures 2-2** to **2-5** and will consist of:

- Phased extraction of sand and gravel (wet working) over an area of c. 11.7 hectares with processing that includes crushing and screening and all ancillary works and structures;
- Provision of new site facilities to include wheelwash (c. 35m²), weighbridge (c. 69m²); mobile welfare pod facility (c. 16m²) consisting of office, canteen, toilet and drying room; dedicated parking area, perimeter vegetation planting and fencing.
- Access to the site will be via an existing entrance onto the local access road to the north of the site;
- Progressive restoration of the site to naturally regenerated wildlife habitat and a permanent water body; and,
- The proposed development life is for 15 years to complete extraction and restoration operations.

Methodology

10.3 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 properties (dwellings and farms) and sensitive ecological receptors;
- baseline conditions pertaining to existing background and ambient noise levels around the project 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, and,
- a summary of any residual impacts.

10.4 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 **Appendix 10-A**.

Contributors / Author(s)

10.5 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

10.6 The prevailing noise levels at noise sensitive locations in the vicinity of the site and haulage routes was determined through onsite 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

10.7 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

10.8 The application site is located within the townland of Derryarkin, Croghan, Rhode, Co. Offaly, approximately 2 km from the Offaly / Westmeath county border. Rochfortbridge (Co. Westmeath) is c. 4.5km northwest and Rhode (Co. Offlay) is c. 5km southeast of the application site, refer to **Figure 1-1**.

Nearest Noise Sensitive Receptors

10.9 Noise sensitive locations are defined in the Environmental protection Agency *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".*

10.10 The nearest noise sensitive receptors to the proposed site primarily comprise residential dwellings dispersed to the southwest of the proposed development. These are shown in **Figure 10-1**.

10.11 The closest receptors have been identified and assessed based on their distance to key working areas proposed as part of the application. The receptors considered as part of the noise impact assessment include all residential dwellings located within 1km of the proposed site boundary. The receptors have been summarised in **Table 10-1**.

Table 10-1 Sensitive Receptors Considered

Reference	Description	Co-ordinates (Irish Transverse Mercator)	
		X	Y
R1	Residential	648,583	735,984
R2	Residential	648,499	735,980
R3	Residential	647,993	736,190
R4	Residential	647,889	736,090
R5	Residential	647,751	735,905

10.12 Additional consideration has been given to the proximity of potentially noise sensitive ecological receptors in the vicinity of the site. The nearest designated sites include Raheenmore Bog SAC/pNHA (approx. 5.2 km to southwest); Milltownpass Bog NHA (8 km to north); Grand Canal pNHA (approx.. 5 km southeast). These sites are located at a sufficient distance from the proposed development that potential noise impacts will be negligible.

10.13 Impacts on ecological receptors has therefore not been considered further in the assessment.

Potential Noise Impacts from the Proposed Development

10.14 The proposed development to be carried out on site will include a number of activities and processes that have the potential to generate noise impacts, these include:

- Ground clearance of the proposed extraction area with heavy machinery will have the potential to give rise to noise impacts offsite;
- Once operational, the extraction process will require use of heavy machinery for removal and handling of material.

10.15 In addition to ongoing material extraction and processing, the proposed development will also include the restoration of the site to ecological habitat.

10.16 It is intended that the proposed development will be operated during the hours of 07:00 to 18:00 hours from Monday to Friday (excluding Bank Holidays) and from 07:00 to 14:00 hrs on Saturday with no extraction, processing or associated activities being permitted on Sundays or public holidays. The nature of mechanical plant onsite is such that no plant or process will be run outside of normal operational hours, and as such there is no risk of noise impacts arising during the evening or night period.

Potential Vibration Impacts from the Proposed Development

10.17 The nature of onsite operations (i.e. no blasting, piling or drilling) 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.

10.18 It has been found that ground vibration produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces (TII, 2004). Considering the reasonable state of repair of the R400, potential vibration impacts from road traffic are deemed to be negligible and have not been assessed further as part of this assessment.

Interaction with Other Impacts

10.19 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 Chapter 5 'Biodiversity'.

Planning and Development Framework

10.20 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

10.21 The National Planning Framework (NPF) 2040[1] (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.

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

10.23 *"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."*

10.24 There are no specific policies in relation to noise emissions in NPF for mineral extraction or production of construction aggregates and materials. The stated general development objective is to facilitate the development while at the same time protect the environment.

Local Planning Policy – Offaly County Development Plan 2021-2027

10.25 The Offaly County Development Plan 2021-2027 was adopted on 10th September 2021 and came into effect 22nd October 2021. It provides policies and objectives for the planning and sustainable development of the County from 2021 to 2027.

10.26 The policy objectives in relation to Noise Pollution are as follows:

ENVP-20 *It is Council policy to promote the implementation of the Environmental Noise Directive and associated regulations through the Offaly County Council Noise Action Plan 2018-2023 and any subsequent Plan.*

ENVP-21 *It is Council policy to promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life. Planning permission will not normally be granted for new uses / development or extensions of existing uses that produce significant and unacceptable levels of noise and/or vibration at site boundaries or within adjacent noise sensitive areas, especially residential areas.*

ENVP-22 *It is Council policy that noise sensitive development proposals located within proximity to a noise source, such as an existing or proposed national road, should include noise attenuation measures.*

[1] Draft First Revision to the National Planning Framework (issued July 2024)

Guidance Documents and Assessment Criteria

Noise arising from Onsite Operations

10.27 The EPA (2006) publication *Environmental Management Guidelines for Environmental Management in the Extractive Industry* (Non-Scheduled Minerals) (EMG-EMEI)[2] recommends the following in respect of noise:

- *In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:*
  - *Daytime: 08:00–20:00 h L_{Aeq} (1h) = 55 dBA*
  - *Night-time: 20:00–08:00 h L_{Aeq} (1h) = 45 dBA*
- *Note: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dBA.)*

10.28 The DoEHLG (2004) Guidelines for Planning Authorities (*Quarries and Ancillary Activities: Guidelines for Planning Authorities*[3]*)* recommends similar limit values.

10.29 The EMEI guidelines also provide some guidance in respect of low background noise levels, tonal noise and environmental mitigation works:

- Where existing background noise levels are very low, lower noise ELVs may be appropriate;
- Audible tones or impulsive noise should be avoided at night;
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.

10.30 In relation to short-term temporary activities such as construction of screening bunds, due to the reduced duration of these works and the direct and potentially long-term benefits arising, it would be deemed appropriate that noise from these works should be limited to the values derived from the ABC Method of BS 5228-1:2009+A:2014 *Noise and Vibration Control on Construction and Open Sites - Noise* as described in Sections 10.31 to 10.34.

Noise arising during the Construction Stage

10.31 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* is typically adopted by local authorities for the control of construction noise impacts.

10.32 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 the construction activities.

[2] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf
[3] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

10.33 BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. **Table 10-2** sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Table 10-2 Applicable Construction Noise Thresholds (BS5228-1:2014+A1:2019)

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 5 dB) are less than these values
Note B	Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values
Note C	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) 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.

10.34 The applicable construction noise limits based on the prevailing noise climate in the absence of existing noise from the site shall be 65 dB $L_{Aeq,12hour}$.

Noise Arising from Vehicular Traffic on Public Roads

10.35 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 10-3** 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 10-3 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

10.36 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.

10.37 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 10-4**.

Table 10-4 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 justify a non-significant effect) More Likely to be Significant
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 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.	

Magnitude (Nature of Impact)	Description of Effect (On a Specific Sensitive Receptor)		Significance
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

10.38 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.

10.39 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*.

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

- **NML 01** is adjacent the R400 to the northeast of the proposed site, the position is intended to reflect prevailing noise levels in the vicinity of receptors located adjacent the primary haul route;
- **NML 02** is located to the southwest of the site, the measurement position was selected to establish prevailing noise levels at nearest receptors located away from road traffic however in close proximity to potential cumulative noise levels from the existing windfarm site;

10.41 All measurements were completed using a Class 1 Sound Level Meter (Larson Davis 831). 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.

10.42 Attended noise measurements were completed at survey location NML 01 and NML 02 between 10:01 and 12:27 hrs on Tuesday 23rd September 2025.

10.43 Measurement periods were 15 minutes for both locations with a total of three rounds of measurements completed at each measurement position.

10.44 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.

10.45 During the attended measurements, weather conditions were generally conducive to environmental noise surveys with light to gentle south-westerly breeze (<1 to 4 m/s) present. External ambient air temperature of ~ 14°C was observed.

10.46 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 height of 1.5 m above ground level.

10.47 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

10.48 Noise monitoring results for the baseline survey on are provided in **Table 10-5**.

Table 10-5 Summary of Measured Noise Levels

Location	Time	Free Field Sound Pressure Levels (dB 2x10^{-5} Pa)				
		L_{Aeq}	L_{AFMax}	L_{AFMin}	L_{A10}	L_{A90}
NML**01**	10:01 - 10:16	67	86	32	68	41
	10:16 - 10:31	69	88	31	70	39
	10:31 - 10:46	67	87	28	68	34
NML**02**	11:42 - 11:57	40	61	31	41	33
	11:57 - 12:12	43	57	32	46	35
	12:12 - 12:27	37	59	32	38	34

10.49 The following general observations are made in respect of the monitoring undertaken around the application site:

- Measured noise levels at monitoring point NML01 were dominated by road traffic noise on the R400 as well as birdsong, distant road traffic from the M6 was also audible to the north and influencing background noise levels; and,
- Measured noise levels at monitoring point NML02 were dominated by operations at the existing Kilsaran Derrycoffey Sand and Gravel Pit operations (within which the existing BD Flood concrete batching plant is situated). Aircraft overflight and birdsong were audible intermittently.

10.50 It is noted that the Yellow River wind turbines were not operational during the survey period. Further discussion on potential cumulative impacts has been provided in Section 10.71.

Assessment of Likely Significant Effects

Do-nothing Scenario

10.51 At present, the prevailing noise climate is influenced by a range of activities including the Yellow River wind farm, road traffic as well as the existing permitted extraction activities, noise from agricultural activities would also be expected to contribute at various times of the year.

10.52 Overall, it would be expected that prevailing noise levels would remain generally similar in the medium term.

Noise Impacts during the Construction Stage

10.53 A limited period of construction is expected to be carried out. It is anticipated that the construction stage works as outlined below would be carried out within a 3 to 6 month period:

- Installation and commissioning of weighbridge and adjoining site / weighbridge office, wheelwash facility, staff welfare facilities, dedicated parking area and storage facilities at new infrastructure area along site access / egress road;
- Stripping of topsoil and any underlying (non-granular) overburden soils in advance of sand and gravel extraction;
- Construction of a 2 to 3 m high perimeter berm along the entire boundary of the application site using excavated topsoil and overburden and its subsequent planting with a native woodland mix; and,
- Stockpiling of any excess (non-granular) soils in in the northern end of the proposed site for future re-use in ongoing / planned future restoration works.

10.54 Construction noise levels have been predicted using a proprietary software-based noise model, CadnaA. The calculation algorithms set out in ISO 9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation* have been used, the model has been based on, and has made the following general assumptions:

- A ground absorption factor of 1 (soft ground) between the Site boundary and the noise sensitive receptors (NSRs), onsite, a ground factor of 0.5 has been applied to account for mixed cover and granular nature of extracted material;
- Wind speed: 3 m/s;
- Wind direction: worst-case (source to receiver: downwind);
- Ambient temperature: 10ºC;
- Humidity: 70%;
- A reflection factor of 3; and,
- Detailed topographical data for the Site and surrounding area.

10.55 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.

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

10.57 **Table 10-6** outlines source data based on the mechanical plant expected to be operational during this period.

10.58 All sound pressure levels have been converted to sound power levels by considering the measurement distance and measurement condition, assumed to be hemispherical for all data.

Table 10-6 Source Data for Construction Stage Assessment

Source	BS5528 Ref	Octave Band Centre Frequency (Hz) Sound Power Levels (dB RE 10^{-12} W)								Total dB L_{WA}
		63	125	250	500	1 k	2 k	4 k	8 k	
Loading sand to lorry (23 tonne)	C10.8	113	111	104	104	103	100	100	89	108
Wheeled loader (29 tonne)	C10.3	116	112	109	112	104	98	96	89	111
Articulated dump truck (23 tonne)	C10.19	126	122	117	113	107	107	98	93	115

10.59 The predicted noise levels for each of the nearest NSR during the construction phase has been summarised in **Table 10-7**.

Table 10-7 Predicted Construction Stage Noise Levels

Receptor Reference	Threshold Applicable (dB $L_{Aeq,12hour}$)	Predicted Noise Level (dB $L_{Aeq,12hour}$)
R1	65	56
R2	65	54
R3	65	45
R4	65	44
R5	65	42

10.60 The predicted construction noise levels as presented in **Table 10-7** demonstrate that construction noise levels will fall below the adopted threshold of 65 dB $L_{Aeq,12hr}$ at the nearest noise sensitive locations.

Noise Impacts during the Operational Stage

10.61 For the purposes of assessment, predicted operational noise impacts of the proposed extraction areas have been assessed on the basis that processing would be conducted in four phases, comprising extraction down 6 to 10 metres below existing ground levels.

10.62 Operational noise levels have been predicted using a proprietary software-based noise model, CadnaA. The calculation algorithms set out in ISO 9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation* have been used, the model has been based on, and has made the following general assumptions:

- A ground absorption factor of 1 (soft ground) between the Site boundary and the NSRs, onsite, a ground factor of 0.5 has been applied to account for mixed cover and granular nature of extracted material;
- Wind speed: 3 m/s;
- Wind direction: worst-case (source to receiver: downwind);
- Ambient temperature: 10ºC;
- Humidity: 70%;
- A reflection factor of 3; and,
- Detailed topographical data for the Site and surrounding area.

10.63 **Table 10-8** outlines source data used for operational plant.

10.64 All sound pressure levels have been converted to sound power levels by considering the measurement distance and measurement condition, assumed to be hemispherical for all data.

Table 10-8 Source Data for Operational Stage Assessment

Source	BS5528 Ref	Octave Band Centre Frequency (Hz) Sound Power Levels (dB RE 10^{-12} W)								Total dB L_{WA}
		63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	**8 k**	
Tracked excavator 170 kW, 30 t	C2.16	100	99	102	101	97	94	91	86	103
Loading gravel to lorry 193 kW, 23 t	C10.10	117	114	115	105	106	105	101	96	112
Wheeled loader 198 kW, 29 t	C10.3	116	112	109	112	104	98	96	89	111
Screen (17 tonne)	C10.15	112	110	107	107	102	102	99	92	109

10.65 The predicted noise levels for each of the nearest NSR during the operational phase has been summarised in **Table 10-9**.

Table 10-9 Predicted Operational Stage Noise Levels

Receptor Reference	Threshold Applicable Day (dB $L_{Aeq,1hr}$)	Threshold Applicable Night (dB $L_{Aeq,15min}$)	Predicted Operational Noise Level (dB $L_{Aeq,1hr}$)			
			Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
R1	55	45	47	50	53	53
R2	55	45	46	49	51	51
R3	55	45	41	42	43	43
R4	55	45	39	41	42	42
R5	55	45	38	39	40	40

10.66 It can be seen from the results presented in **Table 10-9** that the noise levels generated during the operational phase will fall well below the relevant day thresholds.

Potential Noise Impacts associated with Additional Road Traffic

10.67 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.

10.68 In the first instance, it is expected that approximately 70% of the extracted material will be transferred initially to the existing BD Flood concrete batching plant to the northwest via the adjacent local road. The remaining 30% of extracted material will travel east to the R400. It is expected that total daily trips generated by the development, including that associated with raw and processed material will be of the order of 19 HGV's per day.

10.69 The majority of development generated HGV movements will travel to and from the site via the R400. No receptors are located on the local road either east of the site entrance to the R400 or between the site entrance and the concrete batching plant, as such no impacts will occur.

10.70 The residual traffic travelling on the R400 needs to be considered in the context of the existing traffic volumes on the road. 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, the volume of additional scheme traffic onto the R400 will result in less than 2% increase in overall AADT levels, as such the impacts will be negligible for noise sensitive receptors located adjacent the R400.

Cumulative Impacts

10.71 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions together with those generated by the proposed development. Therefore, 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.

Permitted but not yet operational developments

10.72 A review of planning applications in the vicinity of the site was conducted. The review confirms that there will be no permitted but not operational developments with potential noise generating operations located in the vicinity of the site.

Existing Operational Developments

10.73 The results of the baseline noise survey confirms that the levels of noise from the existing concrete batching plant and piggery to the north of the site are relatively low.

Special consideration of Yellow River Wind Farm

10.74 A number of turbines forming part of the Yellow River Wind farm are located in the vicinity of the site and the nearest noise sensitive locations. During period of the survey, due to low wind speeds the turbines were not operational and generating noise.

10.75 Wind turbine noise generation is proportionate to the prevailing wind speed. Typically, the predicted levels are assessed against the prevailing background noise levels to determine potential impacts. In this instance, cumulative assessment is concerned with potential impact arising when the noise from the turbines would be at peak levels.

10.76 In order to establish potential noise levels from the turbines, an additional model scenario was developed to reflect turbine noise operations under worst case conditions. Review of the available manufacturer data for the installed turbines (Nordex N117/3600 106 m hub height) indicates that the maximum noise output of the turbines would be 105 dB L_{WA} at 8 m/s (standardised to 10 metres height).

10.77 The manufacturer octave band spectrum data has been presented in **Table 10.10**.

Table 10-10 Sound Power Data for Yellow River Wind Turbine

Unit	Sound Power Level (L_{WA} dB) at Octave Band Centre Frequency (hz)								Total
	63	125	250	500	1000	2000	4000	8000	
Nordex N117/3600 106 m hub height at 8 ms standardised wind speed	85	91	95	97	100	100	95	83	105

10.78 The predicted noise levels arising from the operation of the Yellow River Turbines on predicted noise levels has been presented in **Table 10-11**. Note that typically wind turbine noise levels are presented in terms of the L_{A90} parameter, which is derived by correcting the predicted L_{Aeq} values by 2 dB. In this instance, the higher L_{Aeq} value has been presented.

Table 10-11 Predicted Noise Levels with Yellow River Turbines at Maximum Output

Receptor	Sound Pressure Levels (dB L_{Aeq})			
	Highest Predicted Operational Noise Levels from Proposed Sand & Gravel Pit Development	Yellow River Wind Farm (Max Noise Emission)	Cumulative Predicted Noise Levels with Wind Farm Operational	Influence of WF on Predicted Development Noise Levels
R1	53	37	53	-
R2	51	36	51	-
R3	43	36	44	+ 1
R4	42	36	43	+ 1
R5	40	37	42	+ 2

10.79 Having regard to the guidance presented in **Table 10-4**, it can be confirmed that during peak operational output with all cumulative sources present that the noise generation will likely result in Slight Noise Impacts.

10.80 Notwithstanding, the predicted noise levels will comply with both the relevant construction and operational phase thresholds.

Mitigation

General Best Practice

10.81 The impact assessment has indicated that worst case construction and operational noise levels will fall within the adopted criterion.

10.82 Notwithstanding, it will be a requirement for the operator to employ and implement best practice noise and vibration management techniques in order to maintain acceptable noise levels at nearby noise sensitive receptors.

10.83 BS5228-1:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Noise* and BS5228-2:2014+A1:2019 *Code of practice for noise and vibration control on construction and open sites – Vibration* is the best practice standard for management of noise and vibration on construction and open sites such as quarries and sand and gravel pits.

10.84 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.

Mechanical Plant

10.85 All plant items will be properly and regularly maintained and operated according to the manufacturers' recommendations, in such a manner as to avoid causing excessive noise.

10.86 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.

Vehicle Movement within Site Boundary

10.87 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.

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

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

Monitoring

10.90 It will be necessary that the operator completes annual compliance noise surveys (twice per year) to establish operational noise emissions from the site.

10.91 The surveys 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).

10.92 The surveys shall be completed using a Class 1 Sound Level meter.

Residual Impact Assessment

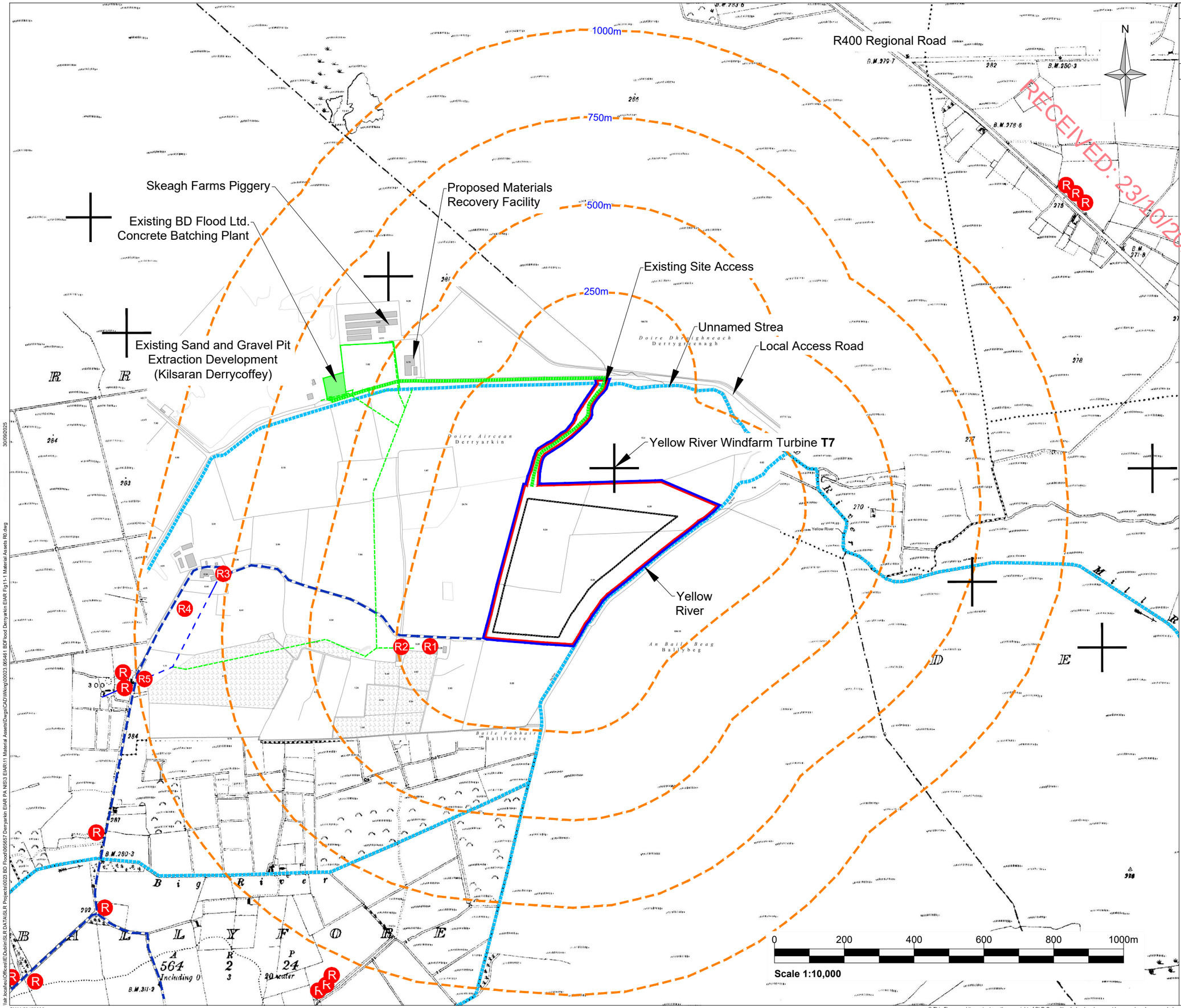
10.93 During the construction stage, under a worst-case scenario for noise generation, there is potential for moderate to significant temporary negative impacts.

10.94 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 negligible impact.

10.95 The adoption and implementation of operational phase mitigation measures is expected to ensure that noise impacts are limited to negligible.

Figures

Figure 10-1 Noise Monitoring Locations & Receptors



Notes:

Tailte Éireann OSi Mapping 5,000 scale - sheet no.'s 3180 & 3181

Legend:

- Applicant Land Interest Boundary c. 19.5 hectares
- Proposed Planning Application Area 19.5 hectares
- Proposed Sand and Gravel Extraction Area 11 hectares
- BD Flood Ltd. Land Interest Boundary 2.5 hectares
- Existing BD Flood Ltd. Concrete Batching Facility (P. Ref. 13/122)
- Surface Water Features (Yellow River / Unnamed Stream)
- Proposed haulage route from S&G pit to Concrete Batching Plant
- Yellow River Wind Farm Turbine Locations
- Distance Off-Sets from Planning Application Boundary *250m, 500m, 750m and 1km*
- R2 Residential Property Locations *Residences numbered within 1km of Application Boundary*
- Uisce Eireann Water Mains
- ESB Overhead Powerlines (400/230V & 10/20KV)

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Client
BD Flood Unlimited Company

Project
Proposed Sand and Gravel Development
at Derryarkin, Co. Offaly

Figure Title
Surrounding Land Use / Material Assets Map

Scale		SLR Project No.	
1:10,000	@ A3	501.00023.065461	
Designed	Drawn	Checked	Authorised
smcd	smcd	lh	lh
Date	Date	Date	Date
01/25	01/25	09/25	09/25

Figure Number **Figure 11-1** Rev. **0**

30/09/2025

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Appendices

Appendix 10-A Glossary of Terms

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

Acoustic Terminology

Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
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.
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fats time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
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.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level	(Lr = $L_{Aeq,T}$) Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (Lp)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 μPa. Defined as:

$$L_p = 20log\left(\frac{p}{p_0}\right)$$