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TABLES

FIGURES

Introduction

16.1 This chapter of the Environmental Impact Assessment Report (EIAR) provides a summary of mitigation and monitoring commitments set out within the technical chapters, as recommended by Section 3.8.4 of the Environmental Protection Agency (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

Mitigation Measures

Inherent and 'Designed-In' Mitigation Measures

16.2 The application site, by its nature, offers a number of advantages in terms of natural mitigation. The proposed development maximises the potential of an existing established sand and gravel pit. The proposed future extraction design aims to utilise the existing sloping topography of the site to screen views from neighbouring properties to the east of the site for as long as possible.

16.3 The scheme proposes temporary grassed screening berms and native tree planting in a number of locations to enhance the natural topographical screening. It further comprises the restoration of the pit to agricultural grazing land, including native hedge planting to establish a field system similar to what is currently present.

16.4 Overburden and topsoil material stripped in advance of extraction works will be used in the temporary screening berms and long term will be used in restoration to lower the pit slopes and enable grass seeding to facilitate a return of the land to agricultural use.

16.5 The processing plant will operate in a closed loop water circuit with silt disposal lagoons to minimise the need for excessive take of groundwater and to eliminate the need to discharge process water from the site.

16.6 Dry working of the sands and gravel deposit will be undertaken ensuring enhanced protection of the underlying regional groundwater body.

16.7 The proposed extraction area boundary has been revised during the EIA process in order to retain a number of mature beech trees located to the east of the site. The proposed design retains the majority (c. 165m) of existing treelines. The landscape plan to be implemented provides for diverse native tree and hedge planting, to assist in screening of views into the extraction site and to enhance the biodiversity value of the site. Specifically, blocks of native trees will be planted along parts of the site boundaries on commencement of the proposed development and 685m of native hedges will be planted across the pit floor to replace 310m of species poor tightly cut hedgerows that will be removed. The native hedges will be established in a field system similar to what is currently present.

16.8 A breeding pond for common frog and smooth newt that was identified during the EIA process in the east of the site will be retained and protected in the proposed development. The proposed natural regeneration of the previous extraction area, which will provide a mosaic of bare ground and exposed areas suitable for use for lizards for basking as well as more densely vegetated areas suitable for shelter and refugia that could be used by this species.

Legislation and Best Practice Mitigation Measures

16.9 The operation of the pit is covered by legislation and industry best practice that is followed by Breedon Ireland in all of its operations.

16.10 For example, operations at the site will adhere to the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008 and this will limit the potential for unplanned events such as instability of pit faces or instability in adjacent lands. Planning legislation enforced through the planning conditions associated with the Section 261 registration process at the existing site has required implementation of environmental mitigation and monitoring there.

16.11 Current best practice guidance include, but is not limited to the following:

- EPA Environmental Management Guidelines (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals); and
- DoEHLG (Department of the Environment, Heritage and Local Government) April 2004: Quarries and Ancillary Activities Guidelines for Planning Authorities.

Specific Mitigation Measures

16.12 **Table 16-1** below sets out the specific mitigation measures that are proposed to be implemented through the proposed development.

Table 16-1 Schedule of Site-Specific Mitigation Measures to be Implemented

Mitigation Measure Proposed		Timeframe
General	Breedon Ireland have a group wide Environmental Management System (EMS) which is accredited to ISO 14001 standard. The EMS contains procedures and work instructions which include specific measures in relation to the protection of air quality and control of dust at operational sites. All personnel within Breedon Ireland undergo EMS training regularly. A site-specific EMS will be developed for the facility.	Throughout all activities of the applicant
Population and Human Health - **General**	The main potential for disturbance to the local population and human health is through the potential for environmental emissions associated with the topic areas that are assessed within other chapters of the EIAR, therefore the mitigation measures proposed in relation to those are considered appropriate to address population and human health issues.	Throughout development
Population and Human Health - **Radon**	Radon testing can be undertaken at on-site structures and, should elevated radon gas levels be detected, remedial measures such as enhanced ventilation or installation of a radon sump can be implemented in agreement with an EPA registered radon tester.	Following construction
Biodiversity – **Protection of Species and Habitats**	Mitigation measures in relation to water, noise and air quality (identified under those headings below) will also protect the biodiversity and integrity of the nearby SPA/SACs, prevent habitat degradation and safeguard fauna species, in particular rare and protected species.	Throughout development
Biodiversity - **Trees**	Proposed native tree planting (c. 1,700m^2), within various blocks around the periphery of the extraction area will compensate for the loss of woodland within the site.	First planting season following commencement
	Tree protection fencing (e.g., heras fencing) will be installed around the root protection areas (under BS5837) of any mature trees in the vicinity of extraction works.	Prior to groundworks in these areas
Biodiversity – **Scrub and Hedgerows**	Temporary screening berms will be created along a section of the northern boundary and the eastern boundary of the proposed extraction area, using overburden and topsoil stripped from the proposed extraction area. The berms will be grass seeded, as soon as they are completed. Some areas within the perimeter screening berms will naturally develop scrub habitat as it re-vegetates over time.	First year of development
	c. 315m of hedgerows will be planted during the landscaping phase and a further 370m will be planted at the final restoration stage to replace removal of 310m. Native species that provide benefits to biodiversity such	During first year of development and final restoration stage

Mitigation Measure Proposed		Timeframe
	as pollinating invertebrates will be favoured. In addition, seed-producing and fruit-producing species being planted to provide foraging benefits for local fauna.	
Biodiversity – **Natural Regeneration**	The existing former extraction area in the north of the site will be left to naturally regenerate. This habitat will be appropriately protected from accidental loss or damage during the construction/operation phase.	Throughout the development
Biodiversity – **Common Frogs, Smooth Newts and Lizards**	• A buffer zone of c. 50m of the habitat surrounding the breeding pond in the east of the site will be retained, which will provide continued suitable terrestrial habitat to these species. This buffer will also ensure that the potential for accidental spillages is further reduced in this breeding place. • An Ecological Clerk of Works (ECoW), comprising a qualified ecologist, will be present on the site throughout the vegetation removal to ensure that no protected fauna is present. Any that are found will be moved to a similar retained habitat.	Throughout the development
Biodiversity – **Birds**	All hedgerow removal will be undertaken outside the nesting bird season (i.e., vegetation removal will be limited to September to February) in order to avoid risking harm or disturbance to nesting birds. Any hedgerow vegetation removal that must be undertaken within the nesting bird season must undergo a nesting bird check by a qualified ecologist. Any nesting birds will be protected by an appropriate buffer to be determined by the ecologist.	Throughout the development
	Retained habitats, native tree planting and natural regeneration areas will compensate for the habitats lost over the long-term.	Throughout the development
Biodiversity - **Bats**	Proposed works will only be undertaken in the daylight, other than during winter when lighting may be required for limited periods during operating hours and when bats are inactive. Artificial lighting will only be implemented at limited areas (i.e., near machinery / buildings etc.). All necessary lighting will be angled downwards and away from any retained or created habitats of value to bats.	During works
Biodiversity - **Otters**	• The removal of livestock from the site will be required to facilitate the construction/operation phase of the development, which will cause a reduction in poaching and nitrogen deposition through reduced cattle faeces in the river habitat. • Artificial lighting will not be prevalent throughout the site, and no artificial lighting will be directed towards the valuable aquatic habitats and associated riparian habitats. Proposed works will only be undertaken	During works

Mitigation Measure Proposed		Timeframe
	in the daylight, other than during winter when lighting may be required. Artificial lighting will only be implemented within limited areas (i.e., near machinery / buildings etc.). All necessary lighting will be angled downwards and away from any retained or created habitats of value to otters. • The mitigation measures in relation to noise and water below will further reduce the potential impacts on otters.	
Biodiversity - **Badgers**	• A pre-commencement survey will be conducted by a qualified ecologist immediately prior to the start of the proposed works to check that the disused outlier sett identified on the site has not become active and requires closing. The check will also ensure that no additional new setts have been created on the site • If any active badger setts are identified, a derogation licence from NPWS will be applied for to close all setts within the proposed extraction area. • Mitigation measures outlined in relation to otters (above) will also be effective in the protection of badgers.	During site clearance works
Biodiversity - **Hedgehog**	An ECoW will be appointed to the site to oversee all removal of woodland, scrub and hedgerow habitats to check that no hedgehogs are present. Any hedgehogs found will be moved to a similar retained habitat.	During site clearance works
Biodiversity – **Pine Marten, Hare, Red Squirrel and Stoat**	An ECoW will be appointed to the site to oversee all removal of woodland habitat to check that no pine marten, hare, red squirrel or stoat are present. If any are identified, the ECoW will ensure that works are stopped until the animal has safely dispersed into an unimpacted area. Mature woodland (and forestry) located outside the proposed extraction area will be retained under the current proposals. These areas are more likely to support pine marten and red squirrel than the areas within the proposed extraction area that will be lost.	During site clearance works
Land, Soils and Geology – **Soil Management**	A specific Soil Management Plan will be developed for the site for the stripping, storage and reuse of the soils in restoration at the site.	Prior to commencement
	Soils will be managed on site in line with best practice measures identified in The Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings, 2021. In order to limit the effects of erosion and deterioration on the soil, material will not be removed during either periods of prolonged dry weather or excessively wet weather; this is to avoid the higher potential for dust generation during extended periods of dry weather, and conversely the greater potential for soil erosion during extended periods of wet weather.	Throughout the development
Land, Soils and Geology –	• Topsoil storage will not exceed 3m in height in order to protect the structure of the soils for use in restoration and any subsoils, if present, will be stored at a maximum height of 5m.	Throughout the development

Mitigation Measure Proposed		Timeframe
Stockpile Management	• Stripped soils will be re-vegetated where they are in place for a sufficient length of time to justify such a measure. The re-handling of soil material will be minimised as much as possible in order to preserve the integrity of the topsoil material. This is also an economically prudent practice.	
Land, Soils and Geology – **Land Stability**	• The design of the extraction area has provided suitable set-back distances to adjoining land boundaries and the final pit slopes to ensure long term stability. • Operations at the proposed development site will comply with the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008 to ensure stability of the adjoining lands.	Throughout the development
Land, Soils and Geology – **Protection of Land Quality and Resources**	• The soils stripped and stored on site during the works will be used for the restoration of the site to return it to a beneficial agricultural after-use.	Restoration phase
Hydrology and Hydrogeology - **Protection of Water Quality**	• No re-fuelling (or servicing) of excavation plant will occur at extraction areas. Refuelling will take place adjacent to the bunded fuel storage area on a concrete pad with associated hydrocarbon interceptor attached. • Fuel and oils will be stored in bunded fuel tanks, which will be covered and enclosed to prevent the build-up of potentially contaminated water within the bund arising from rainfall. A build-up of rainwater in the bund could also reduce the holding capacity of the bund. The bund capacity will be in excess of 110% of the combined volume of the tank(s). • Mobile plant and machinery will not be serviced / maintained within the sand and gravel pit to minimise the risk of uncontrolled release of polluting liquids to groundwater. • A spill kit will be available on-site to stop the migration of any potential accidental leakages or spillages should they arise. • Fuel and oils will be stored in bunded fuel tanks. • Dust management (see Air below) will assist in the protection of water quality. • Areas of bare or exposed soil will, insofar as practicable, be kept to a minimum through the phased extraction proposals.	Throughout the development

Mitigation Measure Proposed		Timeframe
	• All HGVs exiting the site will be routed through the proposed wheelwash. • Periodic sweeping of the internal paved site access road and surrounding public roads will be carried out as required by a mechanical road sweeper. • Breedon Ireland environmental team will undertake quarterly environmental audits at the site to ensure that compliance with all planning consents, licences and EMS accredited to ISO 14 001 standard, is both maintained and enhanced. • Site will be surrounded by stockproof fencing.	
Air – **Dust Management**	• Drop heights will be minimised when handling materials. Excavated soil will be used in construction of vegetated screening berms or in pit restoration works. Materials will be dampened using mist cannon, sprinklers, or water bowser. • Wind protection measures will be incorporated where possible. • On-site haul route length will be minimised. • Mist cannon / sprinklers / water bowser will be used to dampen haul routes during dry weather periods. • Vehicle speeds will be restricted to less than 20kph, signage and staff training will be installed/undertaken. Training will also cover an 'emergency preparedness plan' to react quickly in case of any failure of dust mitigation measures. • Traffic will be routed away from any surrounding sensitive receptors as far as possible. • Road sweeper will be used to reduce the amount of material available for re-suspension. • Surfaces / access road will be paved between the weighbridge and site entrance. • All HGVs will pass through wheelwash facility. • Surfaces of completed perimeter mounds and stockpiles of restoration soils will be seeded. • Stockpiles will be located to take advantage of any available shelter from wind (e.g. on pit floor). • Mechanical disturbance of materials more likely to become airborne will be limited and/or timed having regard to expected weather conditions. • Temporary screening berms will be placed around the extraction works.	Throughout the development

Mitigation Measure Proposed		Timeframe
Climate Change - **Resilience**	• Procedures to facilitate operational shutdown will be implemented where required during extreme weather conditions. • Selection, design, operation, and maintenance of plant and equipment will be considered in terms of climate resilience. • Insurance for site assets and operations will be obtained.	Throughout the development
Climate Change - **Mitigation**	• The Applicant will implement its company-wide Energy and Carbon Policy. • The wider Breedon Group also implement a Carbon Reduction Plan which commits to achieving Net Zero emissions by 2050. • In compliance with the Carbon Reduction Plan, the applicant will implement a GHG monitoring programme at the proposed pit. • Measures that will be considered include use of renewable energy sources / suppliers, use of energy efficient machinery / energy, consider future use of electric plant & machinery where practical, avoidance of unnecessary equipment / transport journeys should be avoided by management of transport and travel demands. • Equipment should not be left in unnecessary idling mode. • Training programme for GHG mitigation to be provided for employees/ contractors.	Throughout the development
Noise – **Management Measures**	• Screening berms will be constructed on the boundary of the site at specific locations using soil stripped from the extraction area. The screening berms will be c. 2m in height and will be located along the northern boundary of Phase 3 adjacent to residence R1, and along the eastern boundary of Phase 2 adjacent to residences R2/R3. • In addition to the screening berms, proprietary fencing adjacent to residences R1 to the north and R2/R3 to the east will be installed. • Prior to commencement of works, the applicant and their appointed contractor will compile and submit to Laois County Council a suitable Construction Noise and Vibration Management Plan (NVMP).	Prior to commencement

Mitigation Measure Proposed		Timeframe

	• The berms and barriers will be inspected on a regular basis and maintained as necessary.
	• The applicant will provide proactive community relations and will notify the public and sensitive premises before the commencement of any works forecast to generate appreciable levels of noise, explaining the nature and duration of the works.
	• The applicant will distribute information circulars informing people of the progress of works and any likely periods of significant noise.
	• BS5228-1:2014+A1:2019 Code of practice for noise and vibration control on construction and open sites will be followed. 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.
	• 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.
	• 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.
	• 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.
	• Vehicles waiting within the site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines.
	• Care will be taken when unloading vehicles to reduce or minimise potential noise disturbance to residents.
	• Trucks owned and operated by the applicant will be required to adhere to a 30 kmph speed limit on the L10317 to ensure road traffic noise impacts on the nearest receptors R2 and R3 are minimised.
		Throughout the development

Mitigation Measure Proposed		Timeframe
	• All trucks owned and operated by the applicant will be kept and maintained in good working order. • Any deliveries to the site will be programmed to arrive during daytime hours only. • A super-silent diesel generator will be used to provide power to the processing plant.	
Material Assets - **Waste**	• All waste generated at the site will be appropriately stored and removed by licenced contractors.	Throughout the development
Archaeology and Cultural Heritage	• A test excavation has been commissioned to investigate the nature of potential archaeological material already identified through a geophysical survey. Any of these anomalies that are confirmed to be of archaeological significance will be preserved by record under licence from the National Monuments Service in advance of development. • The potential of the proposal to negatively affect the setting of the Barrow – unclassified LA011-008---- feature will be mitigated by the construction of a grassed 2m high screening berm and native species planting enclosing the extraction area.	Prior to commencement
Traffic – **Safety and Operation of Local Roads**	• Hedges and trees near the existing site entrance will be trimmed, and maintained regularly, and the embankment will be reprofiled in order to ensure that the south facing sightlines at the access are improved and kept clear at all times. • Further investigation is required to determine if formal passing bays are required, and where they would be located. This would be undertaken in consultation with Laois County Council.	Prior to commencement and throughout the development

Monitoring Measures

16.13 A number of environmental monitoring activities are to be continued during all stages of the proposed development to confirm the effectiveness of the mitigation measures described above, to establish if there are any trends in environmental parameters and to highlight the need for remedial action if necessary.

16.14 Environmental monitoring requirements have been identified in the specific chapters of the EIAR. The frequency of the monitoring requirements identified below have been collated and provided in a schedule displayed in **Table 16-2**. **Figure 16-1** indicates the monitoring locations across the application site. Additional monitoring locations can be provided if deemed necessary by Laois County Council should planning permission be granted.

Population and Human Health

16.15 Monitoring for the protection of population and human health during the proposed development will be carried out in accordance with the wider environmental monitoring programme for the protection of water, air quality and noise.

Biodiversity

16.16 The requirement for future biodiversity monitoring will be determined by the findings of the ECoW monitoring programme during site clearance works.

Land, Soils and Geology

16.17 The restoration works will be managed and monitored during the one-year proposed final restoration period to ensure that the restored soils and land use is successful and to confirm that the restored final pit faces are stable, refer to EIAR Chapter 2 - Project Description.

Hydrology and Hydrogeology

16.18 An expansive network of groundwater monitoring boreholes, located in the shallow groundwater in the superficial deposits, has been installed across the site.

16.19 The following monitoring activities will be carried out to demonstrate that the development is not having an adverse impact on the surrounding environment and will document any improvements in water quality.

- Surface water quality monitoring to be undertaken on a quarterly basis for the duration of the proposed development;
- Groundwater levels in all boreholes will be monitored on a quarterly basis for the duration of the proposed development;
- Groundwater loggers installed in five boreholes will continue to provide for continuous groundwater level monitoring and logger downloads will be undertaken on a quarterly basis for the duration of the proposed development; and
- Groundwater quality monitoring is to be undertaken on an annual basis for the duration of the proposed development.

Air Quality

16.20 Dust deposition monitoring will be undertaken at the site for the duration of the proposed development in accordance with conditions attached to any future planning permission and in line with the EPA and DoEHLG guidelines). Dust monitoring will be undertaken at the

existing baseline monitoring locations D1 to D4 on a quarterly basis (or other agreed time schedule) using the Bergerhoff Method.

16.21 Dust monitoring locations shall be reviewed and revised where and as / when necessary as the proposed development progresses. The results of the dust monitoring will be submitted to Laois County Council as required for review and record purpose.

Climate Change

16.22 A framework and set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This will be documented in the Environmental Management System (EMS).

16.23 Progress in achieving GHG reductions at the site will be monitored, reported and reviewed. This will be documented in the EMS.

Noise

16.24 It will be necessary that the operator complete an annual compliance noise survey to establish operational noise emissions from the site. The noise monitoring locations shall be those N1 to N4 as shown on **Figure 16-1** unless otherwise agreed. The locations will be reviewed and revised where and as / when necessary as the proposed development progresses. The results of the noise monitoring will be submitted to Laois County Council as required for review and record purpose.

Landscape

16.25 Apart from the proposed 2-year aftercare period, as part of the Landscape and the Restoration Proposals (refer to EIAR **Figures 2-5** & **2-6**), to ensure the successful establishment of the native tree and hedge planting, there are no monitoring requirements, arising from this landscape and visual assessment.

Table 16-2 Indicative Schedule of Environmental Monitoring

Activity (Responsibility)	Q1			Q2			Q3			Q4		
	J	F	M	A	M	J	J	A	S	O	N	D
Land, Soils and Geology - Continual monitoring in Year 11 – **Restoration** (Applicant)												
Quarterly Dust Monitoring at 4 locations: (Contracted Consultant)												
Continual Groundwater Level in 5 boreholes with loggers (Contracted Consultant)	logger	logger	logger	logger	logger	logger	logger	logger	logger	logger	logger	logger
Quarterly Groundwater Levels in all boreholes – manual dips (Contracted Consultant)												

Activity (Responsibility)	Q1			Q2			Q3			Q4		
	J	F	M	A	M	J	J	A	S	O	N	D
Annual Groundwater Quality in all boreholes (Contracted Consultant)												
Quarterly surface water quality at 3 locations (Contracted Consultant)												
Annual Noise Monitoring at 4 locations (Contracted Consultant)												
Climate Progress – **GHG Monitoring** Report (Applicant)	*In line with wider Breedon Group's Reporting*											
Landscape Maintenance (Contracted Consultant – Two years following Year 11 - Restoration)												

Figures

Figure 16-1: Environmental Monitoring Locations

Notes:

1. Extract from Ordnance Survey 5,000 scale mapping - sheet numbers 3880, 3881, 3937, 3938 and 6" Raster Mapping - sheet numbers LS010, LS011, OY040

Legend:

- Landowner Boundary (c.32.1 Hectares)
  Third party landowner's land interest
- Planning Application Area (c.12.2 Hectares)
- Applicants Land Interest Area (c.12.4 Hectares)
  under lease agreement from landowner
- Proposed S&G Extraction Area (c.8 Hectares)
- Special Protection Area (SPA)
  Slieve Bloom SPA
- Distance Off-Sets from Planning Application Boundary
  250m, 750m and 1km
- 500m Distance Off-Sets from Planning Application Boundary used for dust impact screening assessment
- R2 — Residential Property Locations
  Residences numbered within 1km of Application Boundary
- D3 — Proposed **Dust** Monitoring Locations
  Proposed **Quarterly** Monitoring
  D1 - D4
- N3 — Proposed Noise Monitoring Locations
  Monitoring Frequency **to be agreed** with Planning Authority
  N1 - N4
- SW1 — Proposed **Surface Water Quality** Monitoring Locations
  Proposed **Quarterly** Monitoring
  SW1 - SW3
- BH01 — Proposed **Groundwater Level** Monitoring Locations
  Proposed **Quarterly** Manual Dip in all BH's
  Proposed **Continuous Logger** Monitoring in BH2 - BH6
  BH1 - BH9

  Proposed **Groundwater Quality** Monitoring Locations
  Proposed **Annual** Monitoring in all BH's
  BH1 - BH9

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Rev	Amendments	Date	By	Chk	Auth

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Client
Breedon Ireland

Project
Sand and Gravel Pit Development at Mounthall, Camross, Co. Laois

Figure Title
Environmental Monitoring Locations

Scale	SLR Project No.
Not to Scale @ A3	00584.065036

Designed	Drawn	Checked	Authorised
SMcD	SMcD	LH	LH
Date	Date	Date	Date
01/24	01/24	09/24	09/24

Figure Number
Figure 16-1

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01/09/2024

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