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**MITIGATION AND MONITORING**



## 16 MITIGATION AND MONITORING

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### 16.1 INTRODUCTION

The purpose of this section is to collate the mitigation and monitoring measures identified in the Environmental Impact Assessment Report (EIAR) that are considered necessary to protect the environment prior to, and during the operational and restoration phases of the Proposed Development.

As described throughout this EIAR, the outline design of the Proposed Development has been progressed by taking account of environmental constraints and considerations that have been identified, thereby enabling avoidance of potential environmental impacts.

### 16.2 MITIGATION MEASURES

Mitigation and environmental commitments have been identified as general requirements which will help to avoid, reduce or offset potential impacts and are relevant to a number of the environmental aspects addressed in the EIAR.

General environmental mitigation measures specified within the EIAR are provided in Table 16-1. These measures cover a number of various environmental aspects and shall help to avoid, reduce and/or offset potential impacts.

Specific mitigation measures identified within the EIAR technical assessments are provided in Table 16-2 to Table 16-13. The timing of the implementation of the mitigation measures is indicated within the tables as:

**Operational Phase:** During the ongoing extraction at the proposed development, including exportation of materials off-site; and during ongoing maintenance and phased restoration of certain site areas; and

**Restoration Phase:** The undertaking of the physical works to fully restore the extracted site upon cessation of extraction activities.

### 16.3 MONITORING MEASURES

A number of environmental monitoring activities are to be continued during the operational and restoration phases. These monitoring activities are required to confirm the effectiveness of the mitigations, to define the quality of the surrounding environment, and to establish if there are any trends in environmental parameters.

Monitoring measures have been identified in each of the technical chapters and an overall monitoring schedule has been provided in Table 16-14.



**Table 16-1 - General Mitigation Requirements**

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
GM1	<p>The Applicant will continue to implement the Environmental Management System at their Site. The purpose of the system is:</p> <ul style="list-style-type: none"> <li>■ Minimise the environmental impact of the operation.</li> <li>■ Ensure compliance with environmental legislation.</li> <li>■ Provide a system of continuous improvement in environmental performance.</li> <li>■ Provide a means to achieve the operation’s environmental policy.</li> </ul> <p>The EMS shall be submitted for agreement with Kildare County Council (KCC). The EMS shall contain the mitigation measures and plans identified in the following Sections (as a minimum), and also the wider EIAR.</p> <p>The Applicant shall incorporate into the EMS and implement the conditions set out in the planning approval.</p> <p>The EMS shall set out all the intended methods to manage potential environmental impacts from the operation and restoration of the Site. The EMS is a live document and will be reviewed on a regular basis and updated accordingly by the Applicant, in particular the document shall be reviewed on receipt of planning approval in accordance with the relevant planning conditions.</p>	Operation & Restoration
GM2	<p>The key elements of the EMS shall include:</p> <p>Appointment of an Environmental Officer by the Applicant for the duration of the activities.</p> <p>Incorporation of environmental commitments, purpose and objectives of the activities.</p> <p>Incorporation of procedures to record any environmental incidents on site and procedures for implementing appropriate corrective and preventative measures.</p> <p>Outlining the relevant guidance (with those outlined in the EIAR as a minimum) that have informed the Plan development.</p> <p>Incorporation of procedures for staff environmental awareness. Incorporation of environmental monitoring procedures.</p> <p>Incorporation of a system of audit and review.</p>	Operation & Restoration
GM3	<p>The appointed Environmental Officer shall ensure that the EMS is fully implemented during the operation and restoration phases in agreement with KCC, to prevent or reduce the impacts identified in the impact assessment.</p>	Operation & Restoration
GM4	<p>The Applicant will implement the Restoration Plan at their Site. This plan will identify the methods by which the restoration works will be managed to meet these commitments and requirements. The Restoration Plan shall be submitted for agreement with KCC. The Restoration Plan will be carried out in accordance with the provisions of the EMS.</p>	Operation & Restoration
GM5	<p>The appointed Environmental Officer shall ensure that the Restoration Plan is fully implemented during the operation and restoration phases in agreement with KCC, to ensure that the site is restored in the interest of environmental sustainability, visual amenity, traffic safety, adjoining residential amenity, and proper planning and sustainable development of the area.</p>	Operation & Restoration
GM6	<p><b>NOTE: Any further general environmental mitigation measures within authorisation or consents to be included in this section and adhered to.</b></p>	Operation & Restoration



**Table 16-2 - Specific Environmental Mitigation Requirements - Population and Human Health**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
PHH1	There are no further mitigation measures related to Population and Human Health other than the implementation of existing site management practices and the implementation of mitigation measures which are identified in each of the relevant chapters of the EIAR.	Operation & Restoration
PHH2	<b>NOTE: Any further mitigation measures related to Population and Human Health detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-3 - Specific Environmental Mitigation Requirements – Ecology and Biodiversity**

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
EB1	<p><b>Standard Operational Emissions Mitigation</b></p> <p>Standard operational emission mitigation measures in relation to the protection of water have been identified in Chapter 6 (Water). These measures are implemented as a matter of routine at the Site, and the Applicant will continue to ensure that this arrangement continues. The implementation of these measures will curtail the ingress of contaminants into areas of FL4, which will concurrently safeguard their condition for amphibians that potentially use these areas for breeding.</p>	Operation & Restoration
EB2	<p><b>Habitats Restoration Plan</b></p> <p>A Restoration Plan (see Chapter 11 Landscape and Visual) has been prepared, which proposes the creation of new habitats following the cessation of the Proposed Development. The Restoration Plan includes for the creation of habitats within the existing quarry pit, which means that substantially larger areas will be created than what is required to be removed. The Restoration Plan also includes for the diversification of species assemblages (i.e. a range of native species will be selected to be added to the Site). Losses of hedgerow/treeline, scrub and grassland will be compensated beyond existing area coverage.</p>	Restoration
EB3	<p><b>Breeding Birds Survey</b></p> <p>A breeding bird survey should be carried out during the breeding season (01 March to 31 August, inclusive), and the results submitted as further information. The report will include detailed proposals for the management of nesting peregrine falcon and sand martin. Recommendations in relation to other species will also be included as necessary, based on the survey findings.</p> <p><b>Mitigation and Compensation</b></p> <p>The clearance of woody vegetation (hedgerows, treelines, scrub and woodland) and any sand martin nests will not occur during the breeding season. If this is unavoidable, an ecologist must survey all areas where works are proposed with nesting habitat, and check for active nests before operations commence. If present, species-specific avoidance zones will be implemented and adhered to until any chicks have fledged or the nest is deemed to be no longer in use.</p> <p>The Restoration Plan (see Chapter 11 Landscape and Visual ) includes proposals to replace at least an equivalent quantity of woody habitat, such that there will be no net loss of breeding habitat.</p>	Operation & Restoration
EB4	<p><b>Bats Survey</b></p> <p>It will be necessary to confirm whether the PRFs identified during the walkover survey are in fact utilised by roosting bats. In line with guidance from Collins (2023; Collins, J., 2023. Bat Surveys for Professional Ecologists: Good Practice Guidelines. 4th ed. London: Bat Conservation Trust). PRF-M features should be subject to a total of 3 'inspection' surveys (explained below) between May and September, with at least two in the period May to August. These should be carried out as close as possible to the proposed works commencement time. PRF-I features should be subject to one inspection survey.</p>	Operation & Restoration

	<p>A <b>PRF inspection survey</b> involves the use of tree-climbing or access equipment such as ladders, MEWPs or scaffold towers to gain access to PRFs. This will allow a more detailed assessment of their likely suitability for bats and to look for more conclusive evidence of bats such as live or dead bats and droppings (staining or odour may also be present). The Applicant will engage a suitably qualified and experienced ecologist to scope and carry out bat survey works. These surveys will lead to one of two possible conclusions – a bat roost is present or it is not. The following subsection provides broad suggestions on appropriate actions in either case.</p> <p><b>Mitigation and Compensation</b></p> <p>If roosting bats are confirmed, then the destruction or disturbance of the roosts would be considered an offence under Section 23 (5)(d) of the Wildlife Acts. In this scenario, a derogation licence would be required via application to the National Parks and Wildlife Service.</p> <p>An experienced bat ecologist may suggest the following measures, or a combination thereof.</p> <ul style="list-style-type: none"> <li>▪ During inspection surveys, if PRFs are found not to be in use, these can be sealed off in order to prevent bats re-entering.</li> <li>▪ Restrict clearance works to September/October, in order to avoid the maternity and hibernation seasons, when bats are most vulnerable.</li> <li>▪ Carry out 'soft felling', such that tree limbs are cut, lowered gently to the ground and left grounded overnight to allow any bats to make their way out;</li> <li>▪ After bats have evacuated the roost, affix limbs that contain roosting features to existing trees (with ratchet straps or similar), so that PRFs are retained within the Site boundary;</li> <li>▪ Affix bat roosting boxes to existing trees that are proposed for retention. This will result in a positive net gain in PRFs within the Site; and</li> <li>▪ Appoint a suitably-experienced bat ecologist to supervise the above works.</li> </ul> <p>If, after sufficient surveys have been undertaken, roosting bats are not found onsite, then a derogation licence will not be required to facilitate clearance works. However, in order to offset the loss of potential roosting habitat, it is suggested that steps 4-6 above be implemented, so that PRFs are retained and supplemented within the Site boundary.</p>	
EB5	<p><b>Badger Survey</b></p> <p>Prior to the commencement of works, confirmatory badger surveys will be undertaken to determine if the potential setts identified are in use by badger, and if any additional badger setts are present in the vicinity of the Proposed Development.</p> <p><b>Mitigation and Compensation</b></p> <p>Unless authorised to do so, heavy machinery will not be permitted within 30 m of an active badger sett, although lighter machinery may be used within 20 m and light work such as vegetation clearance can generally be undertaken within 10 m of setts, (NRA, 2005. Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes, Dublin: National Roads Authority). Where avoidance measures and exclusion zones cannot be used, consultation with NPWS will be necessary to permit disturbance (noting that the NPWS does not presently issue derogation licences for badger sett disturbance or destruction, but can give authorisation and should be consulted). This assessment assumes that if authorisation is granted then appropriate mitigation and compensation will be provided.</p> <p>During the breeding season (December to June inclusive), none of the above works shall be permitted within 50 m of any active setts. Blasting will not be permitted within 150 m of an active sett.</p>	Operation & Restoration



EB6	<p><b>Reptiles – Common Lizard Survey</b></p> <p>In advance of any winter works involving the potential loss of hibernacula for common lizard (areas with dead wood piles or loose rocks), a confirmatory survey will be carried out to determine the presence or absence of hibernating individuals. Surveys will involve the lifting of dead wood or stones, which may disturb the animals, and as such may require a derogation licence from the NPWS.</p> <p><b>Mitigation and Compensation</b></p> <p>If individuals are found and destruction of hibernacula is unavoidable, bespoke mitigation must be designed and agreed with NPWS. This will likely involve the creation of alternative hibernacula in unaffected alternative habitat, and subsequently the careful translocation of individuals.</p> <p>If possible, works in such an area will be delayed until the spring, when common lizard has left the hibernaculum.</p>	Operation & Restoration
EB7	<p><b>Pine Marten, Red Squirrel and other Protected Mammals Survey</b></p> <p>As a precaution, at least one month prior to the commencement of works, all woody habitat proposed for removal will be searched for evidence of pine marten dens (up to 100 m from proposed works where access allows) and squirrel dreys (up to 50 m from proposed works where access allows). During this survey, evidence of the presence of hedgehog, Irish hare and pygmy shrew will also be noted.</p> <p><b>Mitigation and Compensation</b></p> <p>Where a den, drey, burrow or other breeding/resting place is considered a likelihood, an infrared camera trap should also be installed at a suitable location to enable confirmation of the occupancy of a protected mammal.</p> <p>If an active den/drey/burrow is confirmed, and it needs to be removed to facilitate the Proposed Development, a derogation licence will be required from NPWS. This assessment assumes that if a licence is granted then appropriate mitigation and compensation will be provided, such as:</p> <ul style="list-style-type: none"> <li>▪ the exclusion of a pine marten from its den in advance of works (achieved by blocking entrances to the den when the pine marten is not inside, in line with the steps as set out by the Vincent Wildlife Trust (Vincent Wildlife Trust, 2014. The Pine Marten in Ireland – A guide for householders), and subsequently;</li> <li>▪ the provision of an alternative den site (such as a man-made den box) in an undisturbed wooded habitat as near as possible to the original den site.</li> </ul> <p>If removal is not necessary, an ecologist will advise on suitable exclusion zones and/or other measures to minimise disturbance of the den/drey/burrow whilst works are underway.</p>	Operation & Restoration
EB8	<p><b>Invasive Species (Flora) Monitoring for New Growth</b></p> <p>The magnitude of soil disturbance during quarrying operations is such that botanical surveys are considered unnecessary in active areas. However, considering the proposed phased approach to quarrying and restoration, certain areas of the Site will be undisturbed whilst others are active. The Applicant may also choose to begin operations in a certain area, move somewhere else and then come back again. For this reason, it is proposed that whilst the Site is operational an ecologist (or other suitably-experienced professional with good floral ID skills) should carry out a survey at the Site every 3 years.</p>	Operation & Restoration



	<p>Once operations have ceased and restoration has been completed as per the Restoration Plan, the Site should be surveyed annually for a period of 5 years.</p> <p>In the event of emergence of invasive species within the Site, an invasive species specialist should be consulted with a view to determining the most practical and effective method for eradicating the plant(s) from the Site. The approach will be species-specific and will be informed by their location onsite.</p> <p>If, after 5 years, no further growth has occurred, follow-up surveys may conclude.</p>	
EB9	<p><b>Invasive Species (Fauna)</b></p> <p>Regulation 49 (1) of S.I. 477/2011 states:</p> <p><i>“Any person who breeds, reproduces or releases or allows or causes to disperse or escape from confinement, any animal which [...] is included in Part 2A or the Third Schedule [...] or [...] Part 2B or the Third Schedule [...] shall be guilty of an offence”.</i></p> <p>The Regulations therefore make it mandatory for a landowner to take action against the spread of scheduled invasive fauna, because failure to act can be interpreted as “allowing to disperse”. ‘Scheduled species’ in the context of this site refers to Sika deer and grey squirrel.</p> <p>An invasive species specialist shall be consulted to determine the most effective way to deal with feral goats, Sika deer and grey squirrel. The NPWS should also be consulted.</p>	Operation & Restoration



**Table 16-4 - Specific Environmental Mitigation Requirements – Land, Soils and Geology**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
LSG1	Mobile plant on the Site is regularly maintained, and where plant is damaged or leaking it is either removed from the Site for repair or removed to an on-site maintenance shed for maintenance and/or repair (depending on the extend of the damage to the plant). Damaged or leaking plant is fixed or replaced immediately as part of ongoing operational management of the Site.	Operation & Restoration
LSG2	Overburden removal and restoration activities should only occur during favourable environmental conditions.	Operation & Restoration
LSG3	Re-handling of the topsoil is kept to a minimum to preserve the integrity of the material.	Operation & Restoration
LSG4	Topsoil and subsoils will be stored separately, as appropriate.	Operation & Restoration
LSG5	Stockpiles to be stored at appropriate low angles to ensure stability.	Operation & Restoration
LSG6	Groundwater quality monitoring of existing wells and artificial ponds on site is undertaken as per measure W2 and W3.	Operation & Restoration
LSG7	The quarry manager will continue to ensure compliance with relevant safety and statutory legislation and best practices recommended by the Irish Concrete Federation (ICF) and National/EU Legislation (and Guidelines).	Operation & Restoration
LSG8	The design of the quarry and operation of faces will comply to the Safety, Health and Welfare at Work (quarries) Regulations (S.I. No. 28/2008). The Applicant will ensure that excavated faces are operated and maintained so as to ensure, so far as is reasonably practicable, that instability or movement which is likely to give rise to a risk to the safety, health and welfare of any person is avoided.	Operation
LSG9	Soil cover will be restored in the extraction areas of the quarry upon cessation and planted with native grassland species (for grazing). Some quarry faces will remain in place to provide additional biodiversity for breeding birds such as Sand Martins (in sand and gravel faces) and Ravens and Peregrine Falcons (on rock faces). Soils and overburden stripped will be used in the creation of screening berms, and reused in the ongoing and phased restoration of the Site.	Restoration
LSG10	Regular geotechnical appraisals to be carried out on site to assess the stability of the worked faces and silt pond.	Operation & Restoration
LSG11	Quarrying activities are to not intercept the confined aquifer within the bedrock.	Operation
LSG12	To move the location of the silt pond to the base of the quarry, at the ca. 196 mAOD elevation. This will allow for the silt pond to cover a greater area, with reduced need for overflow.	Operation
LSG13	<b>NOTE: Any further mitigation measures related to Land, Soils and Geology detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-5 - Specific Environmental Mitigation Requirements - Water**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
W1	Implementation of updated EMS;	Operation & Restoration
W2	Groundwater quality monitoring of existing wells and artificial ponds on-site is currently undertaken quarterly. Bi-annual commitment.	Operation & Restoration
W3	Groundwater level monitoring of the eight existing wells on-site is currently undertaken monthly. Quarterly commitment.	Operation & Restoration
W4	There will be no discharge to surface water as aggregate processing takes place in a closed-circuit system);	Operation
W5	Sewage effluent treatment systems will be maintained on-site to treat domestic wastewater resulting from the Maintenance Shed;	Operation & Restoration
W6	Welfare facilities at the Control Room with holding tanks periodically emptied by a licenced contractor. Plan to upgrade to a Oakstown BAF 6PE wastewater treatment system, which will require a future planning application;	Operation & Restoration
W7	No excavation shall take place below the water table. This is defined as the depth to the bedrock aquifer, due to the aquifer being confined.	Operational Phase
W8	All soil / overburden stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion. Stockpiles will be kept away from drainage ditches to prevent the potential for runoff and shaped to prevent erosion;	Operation & Restoration
W9	Restoration of topsoil and overburden will be carried out on a phased basis to reduce the vulnerability of the underlying aquifer to possible contamination;	Operation & Restoration
W10	Mobile plant maintenance activities will use a dedicated concrete hardstanding apron (with associated interceptor) – at the Maintenance Shed. Static plant or tracked excavators will be refuelled with care. In addition, spill kits will be maintained on site to deal with all spills and leaks, and spill training will be provided to relevant staff members;	Operation & Restoration
W11	Internal trafficked areas of the Site will be managed by a mobile water bowser during times of dry weather;	Operation & Restoration
W12	Surface water runoff from any hard-standing areas should pass through a Class 1 Hydrocarbon interceptor prior to discharge	Operation & Restoration
W13	Hydrocarbons will be stored in bunded tanks on an impermeable hardstanding surface. All diesel fuel and hydraulic fluid is stored in bunded fuel tanks. The bund capacity is in excess of 110% volume of the combined volume of the tanks within the bund. The arrangement for storage and management of fuel distribution significantly reduces the risk of contamination of the subsoil and groundwater environment;	Operation & Restoration
W14	An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor and key personnel trained in their use;	Operation & Restoration



W15	Waste production on-site is minimised and that all residual waste is handled in accordance with relevant legislation. In accordance with Waste Management Regulations, all waste is currently removed from the Site by licensed hauliers. This operational procedure will be continued throughout the life of the Site;	Operation & Restoration
W16	All plant and machinery utilised in the process is and will continue to be regularly serviced and maintained. The Environmental Management System makes provisions for the full time Safety Officer to undertake regular inspections ensuring that all machinery is of sufficient standard for use. This regular servicing and inspection of machinery will reduce the risk of leakages from plant and machinery impacting ground conditions; and	Operation & Restoration
W17	Stripping of overburden shall be avoided until is deemed necessary to access phased areas.	Operation
W18	The water recycling plant will be monitored and maintained at regular intervals to ensure proper functioning	Operation
W19	Settlement (silt) ponds from the aggregate washing plant should be inspected daily.	Operation
W20	Regular geotechnical appraisals to be carried out on site to assess the stability of the worked faces and silt pond.	Operation & Restoration
W21	To move the location of the silt pond to the base of the quarry, at the ca. 196 mAOD elevation. This will allow for the silt pond to cover a greater area, with reduced need for overflow.	Operation
W22	BH3K to be replaced with a bore that intercepts the bedrock aquifer.	Operation
W23	<b>NOTE: Any further mitigation measures related to Water detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-6 - Specific Environmental Mitigation Requirements - Air Quality**

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
AQ1	Dust monitoring will continue to be carried out monthly at the designated monitoring locations, however their exact locations may change as excavation progresses. These will be repositioned within the site boundary at the closest location to the relevant sensitive receptor;	Operation & Restoration
AQ2	The timing of operations will be optimised in relation to meteorological conditions, for example overburden/topsoil will not be stripped during dry periods to reduce potential dust emissions;	Operation & Restoration
AQ3	Material in outdoor stockpiling will be located away from sensitive receptors and prevailing wind to minimise dust erosion;	Operation & Restoration
AQ4	Overburden mounds will be seeded to eliminate wind-blown dust;	Operation
AQ5	Perimeter bunds will be 2 m high and 8 m wide, and seeded to eliminate wind-blown dust;	Operation
AQ6	A water bowser will be available on Site for dust suppression/dampening to minimise dust blow during working hours;	Operation & Restoration
AQ7	The water bowser is also deployed on the shared haul route between the Applicant's Kildare and Wicklow sites. A fixed water spray system is also available on the Applicant's own section of the haul route on their Wicklow site during drier periods;	Operation & Restoration
AQ8	HGV's carrying fine aggregate will be covered prior to exiting the quarry;	Operation
AQ9	A sprinkler system is in place between the weighbridge and public road and available during drier periods. This route is cleared daily from loose dirt and debris to the exit point at the public road;	Operation
AQ10	Plant will be regularly maintained;	Operation & Restoration
AQ11	On site speed restrictions (<30 kph) will be maintained in order to limit the generation of fugitive dust emissions; and	Operation & Restoration
AQ12	All vehicles exiting the existing site will exit through the existing wheel-wash.	Operation & Restoration
AQ13	<b>NOTE: Any further mitigation measures related to Air Quality detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-7 - Specific Environmental Mitigation Requirements – Climate**

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
C1	No vehicles or plant will be left idling unnecessarily.	Operation & Restoration
C2	Vehicles and plant will be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery will be stopped immediately, and any problem rectified before being used.	Operation & Restoration
C3	Engines and exhaust systems will be regularly serviced according to the manufacturer's recommendations and maintained to meet statutory limits/opacity tests; Full loads used in road haulage in order to minimise the carbon footprint per load of exported materials; and minimising the double handling of materials	Operation & Restoration
C4	Carbon release from the progressive stripping of soil and overburden will be minimal, however it's contribution to carbon emissions is noted. Overburden will be stockpiled on the quarry site within the screening berms, which will be planted. Coupled with the ecological screening areas set aside, the perimeter berms will ensure that the carbon loss through soil stripping is neutral. In addition, during extraction of greywacke, excess topsoil and overburden generated will be used in the progressive restoration of worked-out areas.	Operation
C5	Soils stripping during wetter periods will ensure that carbon losses are reduced compared with warmer drier periods.	Operation
C6	Excess topsoil will be used in the ongoing restoration of the Site to the south-east.	Restoration
C7	The site will undergo planting of native tree and shrubs and indigenous plant species encouraged to re-colonize worked out areas. The cessation of dewatering of the site will result in the formation of a water body, providing an environment for increased biodiversity. Following the restoration and the establishment of agricultural land and the maturity of the planted areas of the site, there will be a permanent effect (>60 years) of carbon sequestration, resulting in a positive effect on the microclimate.	Restoration
C8	<b>NOTE: Any further mitigation measures related to Climate detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-8 - Specific Environmental Mitigation Requirements - Noise**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
N1	Noise mitigation measures for the proposed extension area and northern pit will be incorporated into the design and operation from the existing quarry operation's management and work practices.	Operational Phase
N2	A noise monitoring programme will be maintained at the existing monitoring locations biannually, (however currently undertaken every two months). This will determine whether noise levels are within thresholds as specified in the EPA Guideline Document for Extractive Industries (2006), and the Irish Concrete Federation Environmental Code, (2nd Edition, 2005). Any measured exceedances of the threshold levels at locations representative of the nearest noise sensitive receptors as a result of quarrying operations will be communicated to the Quarry Manager on the day of the survey so that the cause of the exceedance can be identified and measures put in place to reduce noise below the threshold level.	Operation & Restoration
N3	Site activities will only take place during the permitted hours of operation and will be monitored (see N2) to determine compliance with the conditioned noise limits. There will be no activities on site on Sundays or Public Holidays.	Operation & Restoration
N4	Perimeter screening berms will be constructed along the relevant site boundaries.	Operation
N5	Screening berms will be planted with native tree and shrub species.	Operation & Restoration
N6	All haul roads will be kept clear and maintained in a good state of repair to minimise noise from rattling and bouncing of mobile plant.	Operation & Restoration
N7	Heavy goods vehicles entering and leaving the existing the Site will have tailgates securely fastened. All mobile plant used at the proposed development will have noise emission levels that comply with relevant guidance.	Operation
N8	Plant will be operated in a proper manner with respect to minimising noise emissions, e.g. minimisation of drop heights, no unnecessary revving of engines, plant used intermittently not left idling.	Operation & Restoration
N9	Plant will be subject to regular maintenance, i.e. all moving parts kept well lubricated, the integrity of silencers and acoustic hoods maintained.	Operation & Restoration
N10	Haul routes within the northern pits should be demarked around the perimeter of the pit to maximise topographical screening to reduce any potential noise impacts on nearby residential dwellings.	Operation
N11	Haul routes will be designed so as to have as low a gradient as possible so as to minimise excessive revving of vehicle engines on-site.	Operation
N12	30 kmph speed limit will be applied to access road.	Operation
N13	Plant will be fitted with effective exhaust silencers and maintained in good working order to meet manufacturers' noise rating levels. Defective silencers will be replaced.	Operation & Restoration



N14	Quarry operations such as blasting, excavation or crushing will not occur outside normal operating hours.	Operation
N15	All site plant, machinery and vehicles will shut down when not in use.	Operation & Restoration
N16	Mitigation measures for noise control are included in the site-specific Environmental Management System (EMS) with Best Practicable Means being adopted for site activities. The effective application of these mitigation measures will also be monitored during any future restoration activities.	Operation & Restoration
N17	<b>NOTE: Any further mitigation measures related to Noise detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-9 - Specific Environmental Mitigation Requirements - Vibration**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
V1	Blast events will be conducted by an approved blasting contractor in accordance with best practice in this field, and potential impacts associated with the activity will therefore be minimised.	Operation
V2	All operatives involved in the blasting procedure will be adequately trained and suitably competent.	Operation
V3	The use of delayed blasting techniques whereby each blast event takes place in a series of timed small blasts rather than a single large blast will be employed to minimise vibrations in the rock body.	Operation
V4	All shot holes will be drilled to exact specifications by specialist contractors. Any features encountered during drilling such as cavities or soft material will be recorded by the drilling contractor and this information will be subsequently passed on to the shot-firer so that the correct charge will be used. This will ensure safe and efficient blasting of the rock face.	Operation
V5	In addition to implementing the necessary blast specifications, the quarry operator will provide appropriate advance warning of blasts to neighbouring residents, undertake required environmental monitoring and record any complaints arising, as detailed below. The following blast warnings will continue to be provided by the quarry: <ul style="list-style-type: none"> <li>■ A warning sign will be posted at the quarry entrance on the day of each blast and will be removed following each blast;</li> <li>■ Residents will be notified of blasting times by means of a phone call or text message prior to the blast taking place;</li> <li>■ The blast operator signals 30 seconds prior to each blast;</li> <li>■ The blast operator signals after each blast under Garda supervision.</li> </ul>	Operation
V6	Ensuring that the optimum blast ratio is maintained and ensuring that the maximum amount of explosive on any one delay, the maximum instantaneous charge is optimised so that the ground vibration levels are kept below those specified.	Operation
V7	Blasting operations shall be confined to between 1000 hours and 1800 hours, Monday to Friday. Blasting shall not take place on Saturdays.	Operation
V8	Vibration levels from blasting shall not exceed a peak particle velocity of 12 millimetres per second, measured in any three mutually orthogonal directions at any sensitive location. The peak particle velocity relates to low frequency vibration of less than 40 hertz where blasting occurs no more than once in seven continuous days. Where blasting operations are more frequent, the peak particle velocity limit is reduced to eight millimetres per second. Blasting shall not give rise to air overpressure values at sensitive locations which are in excess of 125 dB (Linear) maximum peak with a 95% confidence limit. No individual air overpressure value shall exceed the limit value by more than 5 dB (Linear).	Operation
V9	The quarry operator will engage with GNI to agree appropriate vibration limits for its infrastructure and a method and programme of monitoring such that compliance with limits will be established as required.	Operation



V10	All blasts measured (ground vibration & air overpressure) in the area of at least one sensitive residence to determine compliance with the aforementioned limits and, so that information can be employed in any necessary modification of future blast designs.	Operation
V11	Monitoring of vibration levels at local residences will be conducted in agreement and with the consent of local residents. The quarry manager will give at least 24-hours' notice to the residents at whose homes vibration monitoring will occur. GNI will also be contacted in advance of any blasting activities in close proximity to their pipeline to the north of the quarry.	Operation
V12	Vibration monitoring records will continue to be maintained by the Quarry Manager and will be available for display to local residents that may have been affected by site operations.	Operation
V13	The Quarry Manager will maintain a written complaints log in which all complaints made by local residents are detailed. This will ensure that the concerns of local residents who may be affected by site activities are considered during the management of activities at the quarry site.	Operation
V14	<b>NOTE: Any further mitigation measures related to Vibration detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-10 - Specific Environmental Mitigation Requirements - Cultural Heritage**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
CH1	Extraction should be set back 10m from SMR WI005-123---- the Deerpark wall that is situated on the southern edge of the application area forming the boundary with Deerpark townland.	Operation
CH2	Due to the possibility of the survival of previously unknown subsurface archaeological deposits or finds within the unstripped part of the application area in Areas 2, 3, 4, 5, 6, 7, 8, 9 and 10 soil-stripping in these areas should be archaeologically monitored under licence from the National Monuments Service.	Operation
CH3	<b>NOTE: Any further mitigation measures related to Cultural Heritage detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-11 - Specific Environmental Mitigation Requirements - Landscape and Visual Impact**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
LV1	Clearance of the existing agricultural land and field hedgerow boundaries within the site will occur on a phased basis as areas A to E of the quarry are made available to be worked out	Operation
LV2	Soils and overburden stripped will be used in the creation of screening berms along the perimeter of the proposed development. Perimeter bunds will be 2 m high and 8 m wide, and seeded to reduce the visual impact of the proposed development	Operation
LV3	Existing hedgerows will be remediated by the planting of additional native species which will help to fill out any gaps and provided further screening of the quarry as it hedges thicken out overtime.	Operation
LV4	Protection of existing water bodies including establishing a buffer area around the existing pond/surface water body located to the north of the main extraction area and east of the northern lateral extension and planted up with proposed 3-5m wide wet woodland mix of native willow and alder species	Operation
LV5	Annual review/management of the new boundary planting to ensure that it becomes established and provides adequate visual screening, with generic improvements and spot fixes (including supplementary planting or thinning) to be implemented where required.	Operation
LV6	The existing soils of the screen berms and the extracted outcrop waste material will be reused across the site to regrade the worked lands quarry floor and provide a suitable growing media for the proposed planting.  Evidence of the former quarry will remain in the form of some exposed rock faces and sand and gravel faces, which are left to provide ecological benefits in the form of nesting sites.	Restoration
LV7	The proposed planting will include a mix of native meadow grasses and wildflowers, shrubs and trees species which are typically of planting mixes found within the field hedgerows, woods and alongside waterbodies across the local area.  These mixes are identified on the Restoration Plan and include the likes of hawthorn and blackthorn mix for the hedgerows and deciduous trees of oak, alder, birch within the new woods and set through the hedgerows.  Specific species assemblages will be agreed with Kildare County Council.  The proposed planting helps reestablish field patterns previously lost to the Site's former large void and will bring about ecological benefits in the form of new habitat creation, ecological corridors and rich food sources.	Restoration
LV8	The new planting will be maintained for a minimum period of 3 years as part of the initial landscape contract to ensure the planting becomes established and that any planting which fails in this period is replaced with similar by the landscape contractor.	Restoration



	Over time the Site Management will include periodic inspection and maintenance of the boundary planting to ensure its effectiveness as a visual screen and in forming dense field boundary edges. The grassland/meadow areas will likewise be continually managed by as a part of a grazing or mowing regime.	
LV9	<b>NOTE: Any further mitigation measures related to Landscape and Visual Impacts detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-12 - Specific Environmental Mitigation Requirements - Traffic**

Mitigation No.	Description of Mitigation Measure / Environmental Commitments	Stage of Proposed Development
TR01	<p>Mitigations on site for future operations will include a further planning application for road safety and sustainable active travel measures which should include the following:</p> <ul style="list-style-type: none"><li>▪ Road markings and stop signage on the access road, approaching the N81. It is not proposed to include warning signs on the N81 itself, as per the 2020 RSA Stage 1 and 2;</li><li>▪ Development of access road drainage as per the 2020 Traffic Audit;</li><li>▪ Footpath routes are to be formalised between parking areas and the site office;</li><li>▪ Electric vehicle charging points should be constructed adjacent to the site office, in accordance with KCC requirements;</li><li>▪ A Sheffield style bicycle stand will be constructed adjacent to the site office, in accordance with KCC requirements; and</li><li>▪ Signage will be erected along the site access route, alerting vehicles of the possible presence of cyclists, in accordance with KCC requirements.</li></ul>	Operation and Restoration
TR02	Extant dust suppression system to be maintained to reduce spreading of quarry materials on public roads network	Operation and Restoration
TR03	<b>NOTE: Any further mitigation measures related to Traffic and Transport detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation and Restoration



**Table 16-13 - Specific Environmental Mitigation Requirements - Material Assets**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
MA1	Any works required to material assets on or around the Site will be carried out in conjunction with the relevant provider to ensure minimal disruption to the existing users. If utility disruption is required, then prior notification of disruptions shall be given to all impacted properties. This shall include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties shall be undertaken prior to any proposed disruptions, as appropriate.	Operation & Restoration
MA2	Interaction with overhead utility lines in and around the site will be avoided.	Operation & Restoration
MA3	All underground services will be identified, and protection will be put in place.	Operation & Restoration
MA4	Consultation with Gas Networks Ireland (GNI) regarding any works in the lands surrounding the gas transmission line, and for future blasting at the quarry. All works will be carried out in accordance with GNI 2021 'Code of Practice for Working in the Vicinity of the Transmission Network'.	Operation & Restoration
MA5	<b>NOTE: Any further mitigation measures related to Material Assets detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16-14 - Specific Environmental Mitigation Requirements – Major Accidents and Disasters**

<b>Mitigation No.</b>	<b>Description of Mitigation Measure / Environmental Commitments</b>	<b>Stage of Proposed Development</b>
MAD1	Implementation and maintenance of safe working practices and risk assessment across the Site and operational activities.	Operation & Restoration
MAD2	In accordance with Section 55 of the Safety, Health and Welfare at Work (Quarries) Regulations 2008 (S.I. No 28 of 2008) (SHW Quarries Regulations), a geotechnical assessment of the Site should be undertaken by a geotechnical specialist to identify and assess all factors liable to affect the stability and safety of the proposed and existing excavation and provide conclusion as to whether there is a significant hazard by way of instability or movement.	Operation & Restoration
MAD3	<b>NOTE: Any further mitigation measures related to Major Accidents and Disasters detailed within authorisation or consents to be included in this section and adhered to.</b>	Operation & Restoration



**Table 16.15: Hudson Brothers Limited - Environmental Monitoring Schedule**

HBL Environmental Monitoring	Q1			Q2			Q3			Q4		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Groundwater (Levels) <i>Quarterly</i>		✓			✓			✓			✓	
Water (Quality) <i>Bi-annual</i>					✓						✓	
Water Level Monitoring in the Red Bog SAC <i>Continuous levellogger monitoring; bi-annual download.</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dust Monitoring <i>Monthly</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Noise Monitoring <i>Bi-annual</i>					✓						✓	
Vibration Monitoring <i>Conducted during each blast. Ongoing through the year.</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Boundary Inspections <i>Quarterly</i>		✓			✓			✓			✓	