PANTHER

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EXTENSION OF AN EXISTING QUARRY

AT

CARRIGDOWNANE UPPER, ROCKMILLS, CO. CORK

BY

DENNIS O'KEEFE

2023

Panther Environmental Solutions Ltd,
Units 3 & 4, Innovation Centre, Institute of Technology,
Green Road, Carlow, Rep. of Ireland, R93 W248.

Telephone: +353 (0)59-9134222
Email: info@pantherwms.com
Website: www.pantherwms.com

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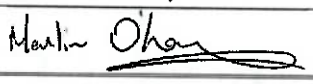
Record of Approval		
Details:	Prepared By:	
Name:	Martin O'Looney	
Title/Position:	Environmental Consultant	
Date:	10th May 2023	
Signature:		
Details:	Checked By:	
Name:	Mike Fraher	
Title/Position:	Director	
Date:	10th May 2023	
Signature:		

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NON-TECHNICAL SUMMARY

GENERAL

This Environmental Impact Assessment Report has been prepared on behalf of, and for the exclusive use of Dennis O'Keeffe by Panther Environmental Solutions Ltd, with respect to an application for planning permission for the continuation and extension of an existing quarry, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork.

The existing Rockmills Quarries Limited activity is located at Carrigdownane Upper, Rockmills, Killdorrery, Co. Cork, P67 YC99. There are no proposed amendments to the current buildings, facilities, inputs, processes or outputs at the existing quarrying activity as part of this application, other than the proposed extension of the activity boundary and extraction areas. The proposed development would be a continuation of the current quarrying activity. The proposed extension would continue to extract stone to a depth of 64m AOD.

Development plan drawings of the proposed development are included as **Attachments 2.1 and 2.2** of this EIAR.

The combined current and proposed extraction area exceed the 5 hectare threshold for the extraction of stone listed in Schedule 5, Part 2. Therefore, the proposed development is required to be screened in order to determine if the proposed project is likely to have significant effects on the environment should be subject to EIA.

Having regard to the criteria outlined in Schedules 7 and 7A of the Planning and Development Regulations, due to the sensitivities of the existing environment, an EIAR has been prepared to accompany the planning application.

The approximate Irish National Grid (ING) reference for the site is E: 172106, N: 106599. The site is located approximately 1.2 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively.

The site is accessed via a private entrance and c.540m road from the L5612. The quarry extraction area boundary is located approximately 420m from the L5612 road. Goods vehicles accessing and exiting the site use the L5612 to connect to the R512, connecting Killdorrery to Glanworth through Rockmills village.

The site access is shared with an adjacent business, Crossmore Tyre Recycling Ireland, which is under the ownership of the extended family of the applicant. The businesses are operationally separate with no shared services, plant or equipment.

HUMAN BEINGS

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads and agricultural facilities involved in cattle rearing, dairy and beef production are located in the surrounding area of the site. The area also supports a number of commercial developments.

The proposed development would have a positive impact upon the local economy by continuing the economic extraction activity and current employment at the business. The continued provision of employment would further contribute to the economy of the area through direct spending of goods and services in the locality.

The potential health and amenity impacts to human beings from the proposed development has been assessed within this EIAR, primarily in relation to air quality, noise, vibration, visual and landscape impacts. Mitigation measures have been proposed in order to ensure no significant impact on these environmental aspects, and are outlined within this EIAR.

AIR QUALITY & CLIMATE

According to the EPA Air Quality Index for public health, the townland of *Carrigdownane Upper* is located in the Rural-West Air Quality Index for Health (AQIH) Region, which is classed as 3 – Good (last update: 25th May 2021).This is within the highest category for air quality. The index is based on information from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution. The dominant existing sources of air pollution in the area would be local road traffic, private residences and emissions from agricultural activities, such as housing of animals and spreading of organic fertilisers.

The main potential sources of air pollutants from the proposed development would be emissions of depositional dust, particulate matter (PM_{10}, $PM_{2.5}$) and combustion emissions such as carbon dioxide, sulphur dioxides (SOx), nitrogen oxides (NOx) and particulate matter (PM_{10}, $PM_{2.5}$).

The impact of emissions from plant and machinery during the construction, operational and rehabilitation phases would be relatively minor in a regional and national context. No significant air quality or climate impacts are anticipated as a result of this emission source.

During the construction and rehabilitation phases, there will be a higher potential for the generation of airborne dust during the exposure and movement of overburden soils and the construction of boundary earth berms. The operation of the proposed development would be a continuation of the current quarrying activity. Therefore, it is anticipated that the current depositional impacts would be maintained during the operation of the proposed development.

As per **section 5.5.1.2**, the set back distances from sensitive residential receptors would make significant dust impacts at these locations very unlikely.

Dust control measures would be implemented throughout the lifetime of the activity to reduce the potential for impacts. Current mitigation measures for dust control are outlined in **section 2.3.2.2** and proposed mitigation measures are outlined in **section 5.6**. It is considered that these

mitigation measures are appropriate for the effective prevention of significant dust emissions from the site.

The preparation of a consolidated Environmental Management Plan for the site would aid in the ongoing maintenance of environmental and housekeeping standards.

NOISE

The construction phase of the proposed development would be a relatively simple operation, consisting of site clearance, topsoil removal and the construction of boundary earth berms. The works would occur on a phased basis over the 10 year lifetime of the proposed planning permission. The removal of overburden would occur in sections as the extraction area expands. The initial overburden removal activities would be used to establish earth berms at the boundaries of the proposed extraction area.

The operation of the extension to the extraction area of an existing quarry activity and would be a continuation of the existing operation. This would consist of the breaking of oversized stones with a hydraulic rock breaker, transport of blasted stone via excavator and front-loader to the crushing machine and screening machine, the transport of graded stone to stockpiles, the loading of transport lorries, the operation of the agricultural lime hopper and lime mill, and the operation of the onsite generator.

The highest noise activities are generally located within the floor of the quarry, where the quarry walls act as an effective noise barrier. The quarry operation is also located at a sufficient set back distance from noise sensitive receptors.

It is noted that, as a continuation of existing quarrying operations and at existing extraction rates, it is not expected that there would be a significant change to the current noise environment of the area.

The following table summarises the current noise conditions under planning permission reference 15/5484.

Noise Limit (monitoring duration)	Applicable period
L_{Aeq} 55dBA (30 minutes)	Quarry operating hours (07:30hrs – 18:00hrs Mon-Fri 07:30hrs-16:00hrs Saturday)
L_{Aeq} 45 dBA (15 minutes)	Any other time

Baseline monitoring and predictive noise calculations have determined that the proposed development would have no noise impacts at sensitive receptor locations. All noise levels were found to be in compliance with the EPA recommended and 15/5484 Planning Condition daytime noise limit of $L_{Aeq,T}$ 55 dB.

VISUAL IMPACT

The proposed development is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by mature broadleaf hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape.

Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Large farmyard complexes are common in the area and are generally composed of barrel or A-shaped sheds with green or dark finish, many including feed type silos either of unfinished stainless steel or green/dark finish.

The proposed development site is located in an area bordered by the Nagle mountains to the south, Ballyhour and Galtymore mountains to the north and the Kilworth mountains to the east. Within the 4 km study area, the landscape is composed of gently undulating hills and ridgelines reaching from valleys of approximately 70m AOD to rises of 80-100m AOD.

As per the Cork County Draft Landscape Strategy (2007), the proposed development site is located in the Landscape Character Type (LCT) 5 – Fertile Plain with Moorland Ridge, and has been designated as a high value landscape under the 2022 County Development Plan. There are no scenic routes within the vicinity of the development.

The proposed site is located on the northern slope of a gentle ridgeline, oriented approximately east -west. The existing and proposed development area slopes from an approximate elevation of 85m above sea level at the southern site boundary to an approximate elevation of 74m above sea level at the northern site boundary.

Due to the undulating topography, as well as mature vegetation throughout the study area, the landscape is somewhat enclosed, providing predominantly limited views. There are however, a number of elevated locations where distant views open up and the scale of the landscape increases.

The undulating topography and abundant mature vegetation provides good screening potential for low-rise development, provided they are similar in scale to the development which is typical within this landscape.

The proposed development would be primarily subsurface and will include the establishment of 2m (high) x 6m (wide) boundary earth berms. The berms will be planted with a double line of hawthorn whips has been planted at 1m spacing. When planting has become established this will provide additional visual screening and assimilation with surrounding vegetation. Supplemental planting would also occur on existing hedgerows and treelines.

The rehabilitation phase of the proposed quarry extension would occur primarily within the quarry pit area, and would not be visible outside the site boundary. There would be no significant visual impacts from this stage of the development.

Given the nature, location, existing and proposed mitigation measures of the proposed site, it is considered that the proposed development would result in no significant overall long–term negative landscape and visual impact. As a result, it is considered that the proposal may be viewed as having an acceptable level of landscape and visual impact.

BIODIVERSITY

The site is surrounded by lands, which are primarily used for agricultural activities. According to the EPA Corine Landuse Map 2006, landuse in the area has been classified as 'non-irrigated land'. The quarry is flanked by an industrial facility to the south. There are a number of domestic residences in the vicinity of the site located mainly along the public roads; comprising one-off rural dwellings and some with associated with farm holdings.

The proposed development is not located within a Natura 2000 site. The nearest Natura 2000 site to the quarry is the Blackwater River (Cork/Waterford) SAC. Although the proposed development site is located approximately 4km east of the SAC at its closest point, the closest point by hydrological connectivity to the Blackwater River (Cork/Waterford) SAC is approximately 18km to the southeast, just east of Fermoy via the River Funshion.

There is no significant hydrological connection between any surrounding NHAs/pNHAs and the proposed development site.

The proposed extension area is dominated by improved pasture for cattle with limited species diversity. Field boundaries consist primarily of hedgerows with sections of mature treeline. No watercourses were noted. No Annex I habitats were recorded within the existing quarry or proposed development site. No rare or protected plant species were recorded during the site survey and given the current maintenance regime/intensive farming practices, are unlikely to occur.

The non-native invasive species Buddleia was recorded along the grassy berms on the northern boundary of the existing quarry. This species is not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, its presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011). However, Buddleia is classified as an Amber Threat species by Invasive Species Ireland and a medium impact species by the NBDC, which under the right ecological conditions may have a negative impact on native species or habitats. Measures for the treatment of Buddleia have been recommended.

The grassland habitats which dominate the proposed development site provide low value foraging habitat for bats. There are no building at the site which could potentially support bat roosts. Although some of the trees within the hedgerow and treelines are relatively old there are no over mature trees which are likely to provide significant roosting habitats for bats. It is noted that the proposed development site provides potential foraging areas for bats along native hedgerows/treelines.

There are no watercourses or wetland habitats within the proposed development site which could provide foraging habitat for Otter. No signs of Otter were recorded within 150m of the proposed development site. No signs of Hare were recorded although this species and the habitats within the proposed development site are no value for this species. No evidence of Pigmy Shrew or Hedgehogs was observed during the field surveys, however these species are likely to occur.

The field surveys show that Badger exists in the area and may use the area as foraging habitat. No evidence of badger sets were found within 150m and trail cams did not show any badger activity.

The Red List species *Anthus pratensis* Meadow Pipit was recorded at the site. A single bird was recorded overflying the grassland habitat. While breeding was not confirmed, this species could potentially be breeding within the larger field at site, as this has not been grazed or cut recently. It is noted that this species will not occur in intensively managed agricultural grassland. The Red List species Kestrel *Falco tinnunculus* was recorded overflying the existing quarry area. However, no signs of Kestrel breeding activity were recorded. Two Amber List species Swallow *Hirundo rustica* and Greenfinch *Carduelis chloris* were recorded.

Signs of Sand martin *Riparia riparia* activity were recorded within the cliffs and stockpiles at the site during the 2023 breeding season. The location of Sand Martin nests will vary from year to year depending primarily on the stability and type of cliff faces available. Active Sand Martin nest holes were recorded in three locations around the quarry within stockpiles and cliff faces.

The site is not anticipated to have a significant negative ecological impact upon the flora and fauna of the area, given that habitats within the proposed development area generally of either low ecological value or common to the area.

In the absence of mitigation measures, significant operation phase impacts could include light spillage onto retained vegetation/valuable habitats outside the site boundary used for foraging or breeding by protected species. Impacts on local groundwater could potentially impact on aquatic species and habitats. Disturbance to protected species could occur from noise or vibration associated with traffic and extraction works.

Comprehensive mitigation measures have been outlined in **section 8.7** of this EIAR to achieve a lowering or reducing of the risk of impact to acceptable levels.

As described in **Section 2.4.2**, 1.749ha of land will be restored to mixed habitats via natural recolonisation, which will create areas of habitat for wildlife. This will ensure that such areas are colonised by a mixture of native species from the surrounding landscape. These species will be appropriate to the local conditions. As the reinstated habitats within the existing quarry mature, there will be a positive, slight and long-term impact on local habitats.

SOILS, GEOLOGY AND HYDROLOGY

The Teagasc/EPA soils map (2006), describes the soils underlying the site as Deep Well-drained Mineral Soils derived from mainly Acidic Materials (AminDW). These soil types are of high agricultural potential and dominate the area. The entire quarry site is underlain by the Waulsortian Limestone Formation. This comprises massive unbedded mud-limestone.

Regionally, the site is located within the Mitchelstown Groundwater Body (GWB). The Waulsortian Limestone beneath the site is characterised by the GSI as a Regionally Important Karstified Aquifer. The GSI groundwater vulnerability mapping shows the proposed extension area is classified as high vulnerability.

The quarry staff informed IE Consulting that no swallow holes or cavities were encountered during the quarrying operations to date. There are no karst features present on the proposed

quarry extension site. However, local knowledge suggests that the area is dynamic, with localised, small swallow holes known to occur in agricultural fields in the wider area.

The proposed quarry development poses no risk to the surrounding groundwater abstraction public supply source protection Zone of Contribution (ZOC's), largely due to their hydraulic position and/or distance from the proposed quarry extension. The proposed development does not contain any natural watercourses. There are no drains, ponds or artificial water courses in the proposed extension area.

Removal of overburden and extraction of rock will increase the groundwater vulnerability and the potential for direct migration of contaminants to the aquifer. The site operations contain a number of processes that could pose a risk to groundwater quality. As described in **Section 2.3.2.2**, control and management measures are in place at the site. Further control measures for the appropriate management of fuels and chemicals at the site have been recommended in **section 9.8.3**.

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

Shanarc Archaeology Ltd. has prepared an archaeological, architectural and cultural heritage impact assessment relating to the proposal to continue operation and to extend the Rockmills Limestone Quarry in Carrigdownane Upper, Co. Cork. The assessment has been prepared for inclusion in an Environmental Impact Assessment Report (EIAR) in support of a planning application to Cork County Council.

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely significant effects on the receiving environment and to propose measures to mitigate these effects. The assessment is based on a desk-top study of the receiving environment supported by an on-site inspection.

The existing Rockmills Limestone Quarry is located in an undulating, rural landscape predominantly under pasture, field enclosed with hedgerow boundaries, and with small wooded areas in the valleys of the rivers. A large tyre recycling compound exists to the immediate south of the current quarry, and contains a recorded monument, ringfort-rath (CO026-024----). The quarry and the tyre recycling compound share an access route from the public road to the east, the access road to the existing quarry continuing around the north side of the tyre recycling compound. It is proposed to extend the quarry to the west of the existing quarry, onto land that is in pasture. There are no proposals to undertake groundworks relating to the existing quarry access road.

No recorded archaeological monument, or potential unrecorded archaeological monument, and no structure listed in the RPS and NIAH have been identified within the existing quarry pit or the proposed extension area. The existing quarry access road is aligned in the Zone of Notification of the recorded ringfort-rath (CO026-024----). No impact on the recorded monument has been identified as no groundworks are proposed on the existing access road.

The townland boundary between the townlands of Carrogdownane Upper and Lisnagoorreen is aligned to the north-west, west and south sides of the proposed extension area, corresponding with the existing boundary ditches, banks and hedgerow. Though not regarded as monuments, townland boundaries are an important element in the Irish landscape and social history of an

area, and can have medieval or earlier origins. Boundaries can also be the focus of votive offerings deposited in prehistory. The existing hedgerows, and therefore the physical representation of the townland boundaries, are to be retained as part of the proposed development.

There is a high number of ringforts in the surrounding area indicating a high early medieval rural population and therefore, the possibility of unknown sub-surface archaeological monuments or features in the vicinity of the proposed development, including greenfield across the proposed quarry extension.

Mitigation measures at the pre-construction, construction and operation phases of the proposed development are provided to address identified effects. These include pre-construction geophysical survey and archaeological test excavation to better assess the subsurface archaeological potential of the greenfield across proposed quarry extension. The proposed development will avoid the townland boundary in order to preserve it *in-situ,* along with any unknown earlier boundary features. The retention of the current field boundaries will greatly reduce the visual and residual effects of the proposed quarry extension on the cultural landscape.

SUMMARY

The potential for the proposed development to cause adverse environmental impacts during the construction, operational and rehabilitation phases, considering the proposed mitigation measures, is anticipated to be negligible.

1.0 INTRODUCTION AND METHODOLOGY

1.1 INTRODUCTION

This chapter broadly describes the legislative context in which the Dennis O'Keefe proposal is presented for the proposed development at Carrigdownane Upper, Co. Cork. This Environmental Impact Assessment Report (EIAR) is compiled following an Environmental Impact Assessment with regard to the characteristics of the proposed development, potential risks and impacts associated with the development, and opportunities to mitigate against any such risks and impacts.

Panther Environmental Solutions Limited (PES Ltd.) has been commissioned by the applicant, Dennis O'Keefe, to prepare an Environmental Impact Assessment Report (EIAR), for the proposed development. Planning permission is being sought for the following:

'*A 10 year planning permission is sought to continue operation of an existing quarry operation, a 4.21 hectare extension of the boundary and all ancillary site works in the townland of Carrigdownane Upper, Co. Cork.*'.

A full description of the existing and proposed development is provided in **Chapter 2.0** of this EIAR document.

This EIAR is to be submitted to Cork County Council in support of an application for planning permission for the proposed development, as described above, under the Planning and Development Regulations 2001 (S.1.No 600 of 2001), as amended.

1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION

This EIAR has been prepared in accordance with the requirements of the European Communities (Environmental Impact Assessment) Regulations, 1989 to 2017, the Planning and Development Act 2000 and the Planning and Development Regulations 2001, as amended. This legislation requires the assessment of the effects of certain public and private projects on the environment.

This EIAR is drafted with particular regard to Article 94 and Schedule 6 in the 2018 planning regulations, and is submitted to provide information that would assist the planning authority in making its decision on this application for planning permission.

The EIA Directive, 2014/52/EU, amending the EIA Directive 2011/92/EU, was transposed into Irish law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

Circular letters issued by the Department of Housing, Planning, Community and Local Government on the 15th of May 2017 (Ref. PL1/2017) and 27th August 2018 (Ref. PL05/2018) have also been consulted in preparation of this report, advising planning authorities and An Bord Pleanála of the procedures and information necessary to comply with the EIA Directive required under the new regulations:

"The new Regulations transpose the requirements of Directive 2014/52/EU, amending previous Directive 2011/52/EU, on the assessment of the effects of certain public and private projects on the environment (the EIA Directive) into planning law with effect from 1 September 2018."

The following documents and guidelines have been consulted as part of the preparation of this report:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018);
- *Development Management Guidelines* (Department of the Environment, Heritage and Local Government, 2007);
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Environmental Impact Assessment of Projects – Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). (European Union 2017);
- Environmental Impact Assessment (EIA) Guidance for Consent Authorities Regarding Sub-Threshold Development (Department of the Environment, Heritage and Local Government, 2003).

EIA contributes to the environmental basis for the decision-making process. EIA screening is usually carried out at the project design stage where it is decided whether EIA is required or not. If EIA is required, then the scope of the EIAR is established (scoping), after which the EIAR is prepared as part of the consent application. Where significant effects are identified during the preparation of the EIAR, it may be possible for these to be avoided or reduced during consideration of alternatives and the design process. The analysis of effects can also contribute to environmental protection by identifying mitigation measures. After the developer applies for consent, the competent authority examines the EIAR, circulating it to statutory consultees while also making it available to the public.

The extent of the proposed scheme is described in detail in **Chapter 2.0:** *Description of Development*. Alternatives to the proposed project characteristics are considered in **Chapter 3.0:** *Alternatives*. The potential environmental impacts of the proposed scheme are addressed in **Chapters 4.0 – 13.0** of this volume of the report under the headings Human Environment, Natural Environment, Material Assets, Architecture, Archaeology and Cultural Heritage, and Interactions and Inter-relationships.

1.3 EIA PROCESS OVERVIEW

Environmental Impact Assessment (EIA) is the process by which the anticipated effects on the environment due to a project are assessed or measured. The Environmental Impact Assessment Report (EIAR) summarises the environmental information collected during the impact assessment of the proposed development.

The steps of the EIA process can be described as follows:

(i) Screening;

(ii) Scoping;

(iii) Preparation of the EIAR;
- Consideration of Alternatives,
- Project Description,
- Description of Receiving Environment,
- Identification and Assessment of Impacts,
- Monitoring and Mitigation Proposals.

(iv) Completion of EIA,
- Scrutiny and Consent,
- Enforcement and Monitoring.

1.3.1 SCREENING

In order to determine if an EIA is required for the proposed development, it is necessary to determine whether the project is listed in one of the Annexes of Directive 2011/92/EU, as amended by Directive 2014/52/EU. These annexes have been transposed into Irish Law, with the prescribed classes of development requiring an EIAR outlined in Schedule 5 of the Planning and Development Regulations, 2001 (S.I. No. 600 of 2001), as amended.

Schedule 5, Part 1, of the above mentioned regulations, prescribes the mandatory thresholds in respect to Annex I projects.

Annex II of the EIA Directive, transposed by Schedule 5, Part 2, of the Planning and Development Regulations, provides E.U. Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of projects, having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

The following development classes may be applicable to the proposed development:

Schedule 5, Part 1,
19. Quarries and open-cast mining where the surface of the site exceeds 25 hectares.

Schedule 5, Part 2,
2 (b) Extraction of stone, gravel, sand or clay, where the area of extraction would be greater than 5 hectares.

13 Changes, extensions, development and testing

(a) Any change or extension of development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would:-

(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule, and

(ii) result in an increase in size greater than:-

-25 percent, or

-an amount equal to 50 per cent of the appropriate threshold, whichever is greater."

The existing and proposed limestone quarry is described in more detail within **Chapter 2.0** below.

The extraction area of the existing quarry has an area of approximately 2.923 hectares. The proposed quarry extension would cover an area of 3.84 hectares (4.21 including boundary berms). Therefore, the proposed quarry would have a total extraction area of approximately 6.763 hectares.

The proposed extension does not result in the proposed limestone quarry being of a class listed in Schedule 5, Part 1. Therefore, the completion of an EIA is not a mandatory requirement under the regulations.

The combined current and proposed extraction area exceed the 5 hectare threshold for the extraction of stone listed in Schedule 5, Part 2. Therefore, the proposed development is required to be screened in order to determine if the proposed project is likely to have significant effects on the environment should be subject to EIA.

Having regard to the criteria outlined in Schedules 7 and 7A of the Planning and Development Regulations, due to the sensitivities of the existing environment, an EIAR has been prepared to accompany the planning application.

1.3.2 SCOPING

Scoping is an essential part of the preparation of an EIAR as it ensures that all potential and important significant impacts on the receiving environment are taken into account at the earliest possible time. Scoping provides relevant information on the most important potential impacts of the project, which will have to be addressed in the EIAR. With regard to EPA criteria for scoping, the environmental areas that may be impacted by the proposed scheme were identified and are as follows:

Human Beings
During scoping, particular regard was given to the potential impact of the proposed development and operations on human beings. The location of the proposed development is rural in character with residences predominantly aligned along the existing road network. In particular, potential impacts which may occur due to noise, dust and landscape / visual impact during the operation of the proposed quarry were considered.

Natural Environment
The potential impacts on land, waters and biodiversity must be assessed with care to ensure that all impacts are clearly identified and where possible removed, reduced or minimised to a satisfactory level.

The proposed development is not located within a Natura 2000 site. The nearest Natura 2000 site to the quarry is the Blackwater River (Cork/Waterford) SAC, approximately 4km west at its closest point. The National Biodiversity Data Centre (NBDC) database lists one threated plant species within R70 10km hectad, i.e., Golden Dock (*Rumex maritimus*). The NBDC also lists a number of both aquatic and terrestrial high impact invasive plant species which have been recorded within hectad R70. The NBDC lists records of Irish Hare, Badger, Fallow Deer, Red Deer, Kingfisher, Golden Plover, Merlin, Peregrine Flacon and Whooper Swan within the R7010km hectad. The proposed development includes for the direct removal of existing habitats within the footprint of the development area which would require an assessment for potential impacts to biodiversity.

The site is located within the Mitchelstown Groundwater Body (GWB)and is characterised by the Geological Survey of Ireland (GSI) as a Regionally Important Karstified Aquifer. The GSI groundwater vulnerability mapping shows the proposed extension area is classified as high vulnerability. The Castletownroche Water Supply Scheme is located approximately 1.4km to the west of the proposed quarry development. The proposed removal of overburden and excavation of limestone bedrock will increase the groundwater vulnerability and recharge potential of the quarry footprint which would require an assessment for potential impacts to land, geology, soil and water.

Material Assets
This involved assessing the impact of the development on land take and the availability of resources such as soils, utilities and natural resources in the area. The development would result in the continuation of the direct extraction of the bedrock limestone natural resource. The proposed project is also anticipated to increase the generation of traffic from the existing quarry.

Architecture, Archaeology & Culture Heritage
According to the *Archaeological Inventory of County Cork* and *National Inventory of Architectural Heritage,* there are no protected structures within or in the immediate vicinity of the proposed development site.

The *National Inventory of Architectural Heritage* record three monuments within 1 kilometre of the proposed development. The southern and western boundary of the proposed quarry extension follow the townland boundary between Carrigdownane Upper and Lisnagoorneen. Though not regarded as monuments, townland boundaries are an important cultural and social element in the Irish landscape.

The nature of the quarry development, the presence of monuments in the area of the development and the presence of the townland boundary within the footprint of the proposed quarry would require an assessment for potential impacts to architecture, archaeology & culture heritage.

1.4 INFORMATION TO BE CONTAINED IN AN EIAR

Schedule 6 of the Planning and Development Regulations, 2001, as amended, specifies the information to be contained within an EIAR, including:

1. (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.

   (b) A description of the likely significant effects on the environment of the proposed development.

   (c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development.

   (d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.

2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:

   (a) a description of the proposed development, including, in particular—

      (i) a description of the location of the proposed development,

      (ii) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases,

      (iii) a description of the main characteristics of the operational phase of the proposed development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used, and

      (iv) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases;

   (b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;

   (c) a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without the development as

far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge;

(d) a description of the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act likely to be significantly affected by the proposed development:

- population,
- human health,
- biodiversity (for example fauna and flora),
- land (for example land take),
- soil (for example organic matter, erosion, compaction, sealing),
- water (for example hydromorphological changes, quantity and quality),
- air,
- climate (for example greenhouse gas emissions, impacts relevant to adaptation),
- material assets,
- cultural heritage, including architectural and archaeological aspects, and
- landscape;

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things—

(I) the construction and existence of the proposed development, including, where relevant, demolition works,

(II) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources,

(III) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste,

(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters),

(V) the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources,

(VI) the impact of the proposed development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change, and

(VII) the technologies and the substances used, and

(ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, short term, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union

level or by a Member State of the European Union which are relevant to the proposed development;

(f) a description of the forecasting methods or evidence used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved;

(g) a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events.

1.5 IDENTIFICATION OF LIKELY SIGNIFICANT EFFECTS

Schedule 6 of the Planning and Development Regulations details the information to be contained in EIAR. The EPA's "*Guidelines on the information to be contained in Environmental Impact Assessment Report, 2022*" states that "*the EIAR should be focused on the **likely, significant** effects*" and defines effect / impact as "*A change resulting from the implementation of a project*".

The assessment of the effects outlined in the chapters which follow, take into account the guidelines given by the EPA and those scales used in other EIAR documents for significant developments in this country. A broad outline of the description of effects is given in **Table 1.1.**

The following factors have been considered for this EIAR when determining the significance of the effects, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment.
- The relative importance of the environment in terms of national, regional, or local importance.
- The degree to which the quality of the environment is enhanced or impaired.
- The scale of effect, for example in terms of land area, number of people effected, number and population of species effected including the scale of change resulting from all types of effects.
- The consequence of that effect occurring.
- The likelihood/risk of the effect occurring.
- The duration of the effect from momentary to permanent.
- The degree of mitigation that can be achieved.

Where mitigation in the form of design measures have been suggested throughout the evolution of the EIAR, these have been incorporated into the scheme design in so far as is possible.

Table 1.1: General EIAR Criteria (Quality of Effects)

Quality of Effects It is important to inform the nonspecialist reader whether an effect is positive, negative or neutral.	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).

Table 1.2: General EIAR Criteria (Significance of Effects)

Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see Determining Significance).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.

Table 1.3: General EIAR Criteria (Probability of Effects)

Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 1.4: General EIAR Criteria (Duration and Frequency of Effects)

Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Table 1.5: General EIAR Criteria (Types of Effects)

Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

There are seven generalised degrees of effect significance that are commonly used in EIA; Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in **Figure 1.1**. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions.

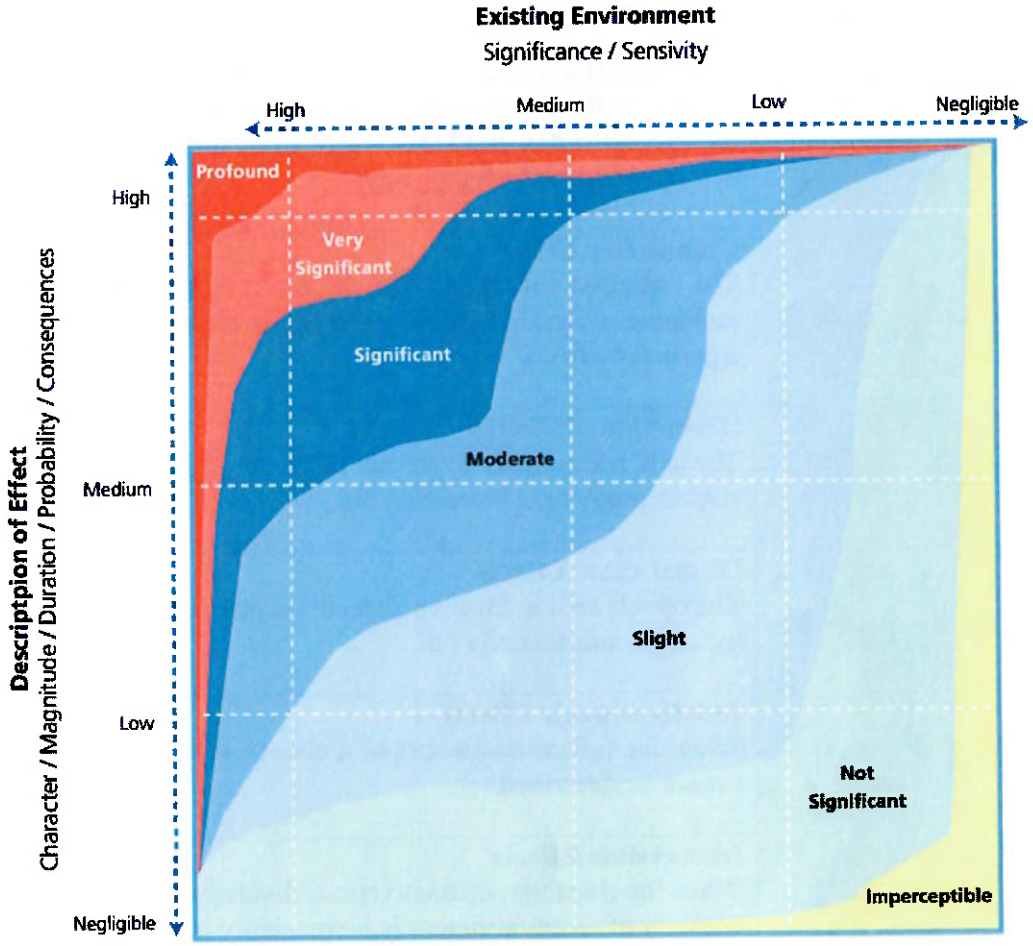

Figure 1.1: Chart Showing Typical Classifications of the Significance of Effects (EPA,2022)

1.6 REPORT STRUCTURE

The main EIAR document is comprised of the following:

Non-Technical Summary:

A summary of the findings of the EIAR, in non-technical language.

Part I: Proposed Development:

Part I describes the existing and proposed development at the site, previous planning applicants and consents and a summary of consultations with the relevant statutory bodies and competent authorities. Part I includes the following chapters:

Chapter 1: Introduction
Chapter 2: Description of the Development
Chapter 3: Alternatives

Part II: Environmental Impacts:

Part II describes the likely significant environmental impacts arising from the proposed development. Where possible, design measures have been included to reduce or eliminate potential impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

Part II has been divided into five main sections, as per the table below.

Table 1.6: EIAR Sections and Sub-Sections

Main Section	Chapters
Section A. Human Environment	4. Population and Human Health
	5. Air Quality, Odour & Climate
	6. Noise Environment
	7. Landscape and Visual Environment
Section B. The Natural Environment	8. Biodiversity
	9. Land – Soils, Geology, Hydrology And Hydrogeology
Section C. Archaeological, Architectural and Cultural Heritage	10. Archaeological, Architectural and Cultural Heritage
Section D. Material Assets	11. Material Assets – Natural and Other Resources
	12. Material Assets – Utilities & Traffic
Section E. Interactions and Inter-relationships	13. Interactions and Inter-relationships

1.7 COMPETENT EXPERTISE

Directive 2014/52/EU states that the preparation of EIAR documents should be undertaken by "*competent experts*", reflected by an appropriate combination of experience, expertise and knowledge.

Panther Environmental Solutions Ltd. (PES Ltd.) is a leading Environmental Consulting Firm based in Carlow, Ireland. PES Ltd was established in 2005 by Environmental Consultant Mike Fraher who has over two decades of experience working in the Environmental Consultancy Industry, both in Ireland and in the UK. The PES Ltd. team are experienced in preparing EIAR documents, having completed a number of these reports for a range of industries including the food and drink and intensive agriculture sectors.

Mr. Mike Fraher has over 25 years' of consultancy experience and has a B.Sc Degree in Environmental Sciences from the University of Glamorgan, Cardiff in Wales and a Diploma in Food Sciences from Cork Institute of Technology.

Mr. Martin O'Looney has over eight years' environmental consultancy experience and has a B.Sc Degree in Environmental Science and Technology from Sligo Institute of Technology. Mr. Nial Ryan has over five years' consultancy experience and has a BSc. in Applied Physics from Dublin City University, an MSc. in Medical Device Regulatory Affairs, a Certificate in Introduction to AutoCAD, and a Certificate in Environmental, Health & Safety Management from Institute of Technology Carlow. Dr Ross Donnelly-Swift has a BSc (Hons) Biology from Maynooth University NUI, a MSc in Environmental Science from Trinity College Dublin and a PhD in Biosystems Engineering from University College Dublin.

Additional expertise was obtained for chapters of the EIAR, as outlined in **Table 1.7** below.

Biodiversity

The biodiversity chapter and biodiversity information in the description of the development were prepared by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ornithology).

Carl Dixon MSc (Ecology) is a senior ecologist who has over 25 years' experience in ecological and water quality assessments. Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included Rural Environmental Protection Scheme (REPS) planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to Badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Dr. Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant specialising in bird behaviour. Sorcha received a BSc in Applied Ecology from UCC and subsequently went on to receive a PhD in behavioural ornithology at UCC. During her PhD research, Sorcha studied bird-aircraft collision with a particular focus on bird behaviour, included field-based behavioural observations at airports, bird cadaver examination and collision classification and the use of radar tracking to model collision risk. Sorcha has worked for over 15 years in a professional ecology role and specialises in the coordination of ecology projects and assessments. She has coordinated and contributed to Habitats Directive Assessments (AA screenings and NIS) and Environmental Impact Assessment Reports (EIAR) for a range of small and large-scale projects with particular expertise in assessing impacts on birds. Notable projects include Arklow Bank Wind Park, Shannon Technology and Energy Park and Waste to Energy Facility Ringaskiddy.

Land – Soils, Geology, Hydrology and Hydrogeology

IE Consulting are a specialist hydrological, hydrogeological and environmental consultancy based in Carlow. Established in 2000, IE Consulting provides services in the areas of hydrogeology, hydrology, flood risk assessments and drainage design.

We provide specialist consultancy services to a range of clients throughout Ireland, including government departmental bodies, local authorities, group water schemes, developers, local businesses and private individuals.

We routinely complete environmental impact assessments of hydrology and hydrogeology for a large variety of projects including major national road schemes, quarries, industrial, residential and agricultural developments.

Jerome Keohane (BSc, MSc, FCIWEM, C. Geol, MIEI, CIWEM), Technical Director IE Consulting - is a chartered hydrogeologist with over 38 years' experience in catchment assessment, source protection, groundwater source development/evaluation/protection, water treatment, hydrogeology, nutrient modelling, water quality assessments, contaminated land and project management. Jerome holds a warrant to advise An Bord Pleanála on planning matters related to hydrogeology.

Kevin Murphy (BSc, MSc) is a Project Hydrogeologist with IE Consulting with 4 years' experience in baseline soil and groundwater assessments, Tier I – Tier III assessments, EIARs, contaminant hydrogeology, environmental monitoring, water resource development and discharge licencing. Kevin is a member of the International Association of Hydrogeologists (IAH).

Archaeological, Architectural and Cultural Heritage

The Architectural, Archaeological and Cultural Heritage section has been prepared by Fiona Reilly MA, MIAI, of Shanarc Archaeology Ltd. Shanarc Archaeology Ltd. was established in 2014 by Mr. Shanahan, specialising in archaeological and geophysical services.

Table 1.7: Contributors to the EIAR

Ref	EIAR Topic	Company	Personnel
	Non – Technical Summary	PES Ltd.	Mr. Martin O'Looney
1	Introduction	PES Ltd.	Mr. Martin O'Looney
2	Description of Development	PES Ltd. DixonBrosnan	Mr. Martin O'Looney Carl Dixon MSc Dr. Sorcha Sheehy PhD
3	Alternatives	PES Ltd.	Mr. Martin O'Looney
4	Population and Human Health	PES Ltd.	Mr. Martin O'Looney
5	Air Quality, Odour & Climate	PES Ltd.	Mr. Martin O'Looney
6	Noise Environment	PES Ltd.	Mr. Martin O'Looney
7	Landscaping and Visual Environment	PES Ltd.	Mr. Martin O'Looney
8	Biodiversity	DixonBrosnan Env Consultants	Carl Dixon MSc Dr. Sorcha Sheehy PhD
9	Land – Soils, Geology, Hydrology And Hydrogeology	IE Consulting Ltd.	Mr. Jer Keohane Mr. Kevin Murphy
10	Archaeological, Architectural and Cultural Heritage	Shanarc Archaeology Ltd.	Ms. Fiona Reilly
11	Material Assets – Natural and Other Resources	PES Ltd.	Mr. Martin O'Looney
12	Material Assets – Utilities & Traffic	PES Ltd. M&McC Eng	Mr. Martin O'Looney Mr Tim Murphy
13	Interactions and Inter-relationships	PES Ltd.	Mr. Martin O'Looney

1.8 CONSULTATIONS

The EPA's "*Guidelines on the information to be contained in Environmental Impact Assessment Report, 2022*" state that "*Consultation is a key element of each stage of the EIA process... While it is generally best to commence pre-application consultation as early as possible, it is not obligatory during the preparation of an EIAR. The extent to which it is carried out is decided by the developer and their team on a case by case basis*".

"*During the statutory consent determination process, the competent authority is obliged to consult with certain authorities. Consultation by a developer with these authorities (if they offer such a service) before formal submission for consent helps the developer to pre-empt issues which may be raised at this stage and to address them beforehand*".

Consultation with relevant authorities has been considered at each stage of the EIA process. Where consultations have been requested or received, these have been described and included within the relevant chapters of this EIAR.

PART I – PROPOSED DEVELOPMENT

This section of the EIAR describes the development proposal by Dennis O'Keeffe comprising of the continuation and extension of an existing quarry in the townland of Carrigdownane Upper, Co. Cork.

This section also describes the existing context of the Rockmills Quarries Limited activity, including a brief description of the current infrastructure at the site and summarises previous planning applications and consents for the site.

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 INTRODUCTION

Planning permission is sought by Dennis O'Keeffe for the continuation and extension of an existing quarry, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork.

The existing Rockmills Quarries Limited activity is located at Carrigdownane Upper, Rockmills, Killdorrery, Co. Cork, P67 YC99. There are no proposed amendments to the current buildings, facilities, inputs, processes or outputs at the existing quarrying activity as part of this application, other than the proposed extension of the activity boundary and extraction areas.

The proposed development would allow the facility to continue the current quarrying operation at this site.

This EIAR is to be submitted to Cork County Council in support of an application for planning permission for the proposed development, as described above, under the Planning and Development Regulations 2001 (S.1.No 600 of 2001).

2.2 RECENT PLANNING HISTORY OF THE SITE

Between 2008 and 2014 minor quarrying operations were undertaken at the Carrigdownane Upper site, within a small unauthorised pit, for use on the applicants farm and an adjacent business under the same owners. Prior to this, the land was used as pasture for grazing cattle.

In 2014, the applicant began the process of gaining retention for the previous extraction activities and gaining planning permission for the extension and development of the site to a formal quarrying operation. Planning permission was received in December 2015.

In 2021 planning permission was received for the retention of a new service yard and lime crushing and storage facilities.

Previous planning applications relating to the existing Rockmills Quarry at Carrigdownane Upper are provided in the table below.

Table 2.1: Overview of Planning for Western Brand, Knockaunacat / Erriff, Co. Mayo

Planning Reference	Decision Date	Applicant	Permission	Description
145474		Denis O'Keeffe	Incompleted Application	(a) Retention and extension of existing limestone quarry, (b) new portacabin (office/toilet/canteen), (c) wastewater treatment plant and percolation area, (d) bored well, (e) diesel tanks, (f) use of existing internal roads, weighbridge & entrance, and (g) Ancillary works
145600	15/09/2014	Denis O'Keeffe	Refused	a) Extension to the existing limestone quarry, (b) new portacabin (office/toilet/canteen), (c) Wastewater treatment plant and percolation area, (d) aggregate storage areas, (e) bored well, (f) diesel tank, (g) use of existing internal roads, weighbridge and entrance, and (h) ancillary works. Permission for Retention of existing quarry area.
155484	02/12/2015	Denis O'Keeffe	Conditional	Permission for (a) extension of existing limestone quarry, (b) new portacabin (office/toilet/canteen), (c) wastewater treatment plant and percolation area, (d) aggregate storage areas, (e) bored well (f) diesel tank, (g) use of existing internal roads, weighbridge and entrance, (h) ancillary works, and (i) Retention of existing quarry area
196736	11/09/2020	Denis O'Keeffe	Refused	To retain the quarry service yard extension, control room, lime crusher enclosure, lime storage shed, site office, generator enclosure, weighbridge office, lime manufacturing, and for permission to extend the lime storage shed, all at the existing quarry.

Planning Reference	Decision Date	Applicant	Permission	Description
215792	16/12/2021	Denis O'Keeffe	Conditional	Permission to retain the quarry service yard extension, control room, lime crusher enclosure, lime storage shed, site office, generator enclosure, weighbridge office, and lime manufacturing, and for permission to extend the lime storage shed, all at the existing quarry.
226008		Denis O'Keeffe	Incompleted Application	Permission to extend the existing limestone quarry at Carrigdownane upper and Lisnagourneen, Rockmills, Co.Cork.
226136		Denis O'Keeffe	Incompleted Application	Permission to extend the existing limestone quarry at Carrigdownane Upper and Lisnagoorneen, Rockmills, Co.Cork.

There are no other previous planning applications for the proposed development site. Planning information is available from the Cork County Council Planning Enquire System, available at http://planning.corkcoco.ie/ePlan/SearchTypes, in addition to visiting the offices of Cork County Council.

2.3 EXISTING DEVELOPMENT

2.3.1 SITE AND SURROUNDING AREA

Rockmills Quarry Ltd is a limestone quarrying and processing activity located within the townland of Carrigdownane Upper, Rockmills, Killdorrery, Co. Cork.

The approximate Irish National Grid (ING) reference for the site is E: 172106, N: 106599. The site is located approximately 1.2 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively.

The site is accessed via a private entrance and c.540m road from the L5612. The quarry extraction area boundary is located approximately 420m from the L5612 road. Goods vehicles accessing and exiting the site use the L5612 to connect to the R512, connecting Killdorrery to Glanworth through Rockmills village.

The site access is shared with an adjacent business, Crossmore Tyre Recycling Ireland, which is under the ownership of the extended family of the applicant. The businesses are operationally separate with no shared services, plant or equipment.

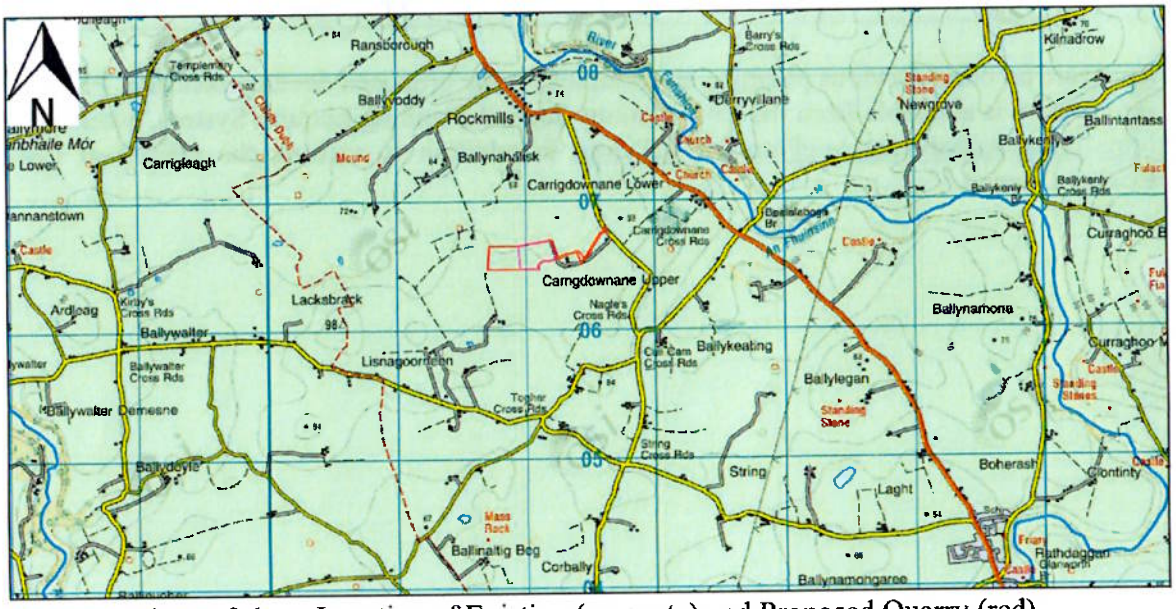

Figure 2.1: Location of Existing (magenta) and Proposed Quarry (red)

The site is located in a rural, farming area predominantly comprised of pastureland and hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape.

Residential development in the area is predominantly linearly aligned along the existing road network. A number of large farm hubs are also located within the area.

2.3.2 EXISTING OPERATION, INFRASTRUCTURE & UTILITIES

2.3.2.1 Existing Site Operation

There would be no alteration to the existing infrastructure, management, or control systems as part of the proposed development.

The site provides employment for approximately 18 to 22 personnel, depending on demand (3 administrative staff, 3 to 4 operators and 12 to 15 drivers).

The hours of operation of the quarry are 07:30 hrs to 18:00 hrs, Monday to Friday and 07:30 hrs to 16:00 hrs on Saturdays.

The current permitted extraction area is approximately 2.923 ha, including berms. The extraction depth is to 64m above ordinance datum (mAOD).

The existing services area is approximately 1.795 ha including berms, wheel wash and office.

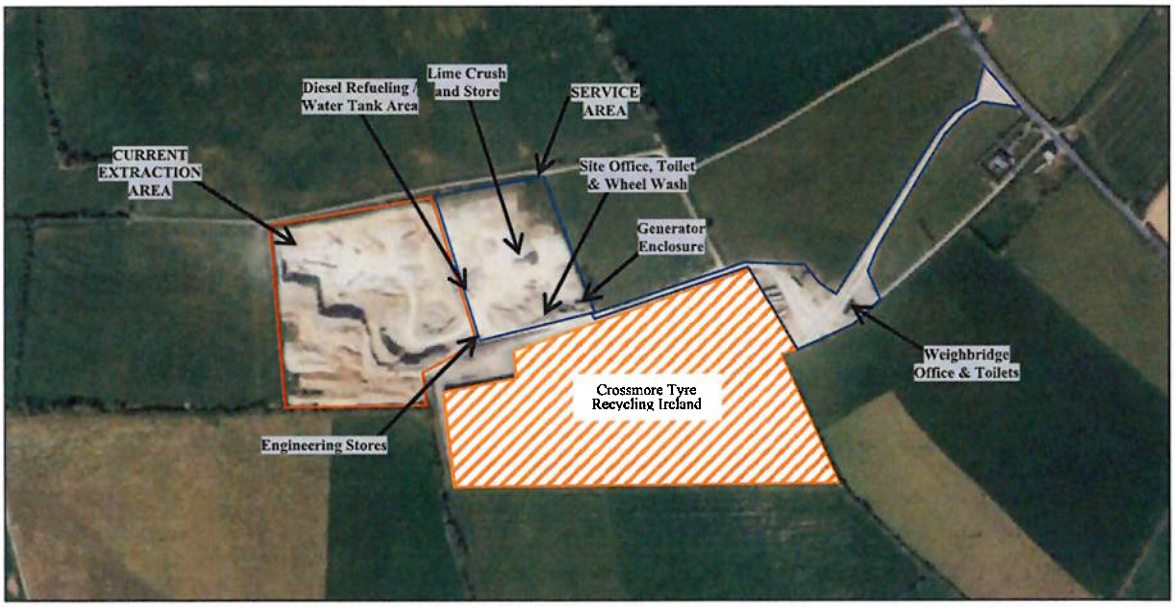

Figure 2.2: Current Quarry Activity Layout

As of June 2022, the quarry has fully extracted the stone to 64m AOD along the eastern and northern boundaries of the permitted quarry area. Extraction is continuing along the western boundary towards the southern boundary.

The extraction operation is carried out as follows:

1. Overburden is stripped as required ahead of the working face of the quarry using a tracked excavator. The depth of overburden encountered thus far is a maximum of c.500mm, consisting mainly of topsoil material. Those soils which have not been used in the erection of boundary earth berms are stockpiled onsite for eventual reinstatement. Earth berms have been planted to promote rapid stabilisation of soils.

2. Limestone is extracted from the working face using controlled blasting.
   Blasting is carried out by a contracted blasting expert approximately every 3-4 months based on demand. Charge holes are drilled into the rockface over 1-2 days, whereupon charges are placed and detonated in-series to deposit rock onto the active quarry floor. Charge type and sizes are selected by the blasting expert to environmental and health and safety criteria.

3. Oversized blasted stone is broken further using a tracked excavator mounted with a hydraulic rock breaker.

4. Broken stone is processed further using a mobile crushing machine. Crushed stone is transferred via the output conveyor to a mobile screening machine which separates the crushed stone into the required grades.

5. Graded stone is stockpiled within the quarry pit floor and service yard. Stone products include stone, chips, blinding and clause 804 aggregates.

Stone is provided to customers for agricultural use, building development and road construction projects as requested.

An estimated 20,000tonnes per annum of the extracted stone undergoes further processing to produce agricultural lime (Lime Licence number is GL189). Processing to agricultural lime consists of:

a) Crushed limestone is loaded into the milling machine hopper using a wheeled front loader.

b) Stone from the hopper is transferred via conveyor to the enclosed milling machine to convert the stone into agricultural lime. The lime mill has been fitted with a dust filtration system.

c) The agricultural lime is transferred via conveyor into an enclosed lime output shed.

d) Lime is moved via front loader and stockpiled within roofed storage shed.

e) Lime is loaded onto lorries using a front loader within the lime yard. A water sprinkler at the wheel wash area is used to dampen the lime for transport (prevent dust).

Aggregate washing is not carried out at the site, however, 804 fill material is sprinkled with water to improve its bonding capabilities under heavy loading (for use on roads, drive ways etc.).

There is no dewatering required onsite, as all extraction takes place at least 1 metre above the water table (maximum recorded groundwater level of 62.93 m AOD @ GW2 in January 2021).

Truck weighing is carried out at the weighbridge and recorded at the weighbridge offices.

2.3.2.2 Existing Mitigation Infrastructure

Planting for dust and visual mitigation has been carried out. A double line of hawthorn whips has been planted at 1m spacing, however, this will not become fully effective until planting has become fully grown. Planting has occurred on the external bunds and existing hedgerow (blackthorn, elder, wild rose and mature ash) along the eastern boundary of the service yard / stockpile area.

Stone crushing and screening is carried out on the pit floor in order to avail of the noise and dust mitigation provided by the quarry walls. Stone stockpiles are also stored within the quarry floor in so far as is possible. Water sprinklers are in place for stockpiles in order to provide for additional dust suppression when required.

The lime mill has been installed with a dust filter and has been enclosed.

A concrete 4m wide access road from the main road to the weighbridge has been constructed, providing lower potential dust generation from unsurfaced trackways. Roads are wetted during dry conditions in order to aid in dust suppression via a water bowser.

A wheel wash is in place and provides for a minimum of one wheel revolution. All trucks are required to use the wheel wash when exiting the site.

Loads containing fines (i.e. agricultural lime) are required to be covered when existing the site. A water sprinkling system has been installed at the wheel wash station for loads of agricultural lime.

Internal and public roads are swept when required (road sweeping / street cleaner).

An area of previously over-excavated ground within the existing quarry has been restored with new material to 64m O.D. in agreement with the county council. The area is surrounded by a gravel bund wall, to ensure no ingress of surface-water from the active quarry area.

2.3.2.3 Existing Services

There is no general stormwater pipework or management system at the site. All rainfall that falls within the footprint of the quarry infiltrates into the services area floor or the quarry floor and migrates vertically down to the water table. There is no discharge to surface-water from the quarry.

The re-fuelling area is paved, with all drainage directed to an oil-water interceptor. The oil-water interceptor is cleaned and inspected regularly. The oil-water inceptor discharges to a soakaway. Vehicle diesel is stored in three double-skinned Carbery Plastics 6m^3 tanks, stored on a concrete plinth draining to the interceptor. A plan to install a crash barrier in front of the tanks to avoid accidental damage is in progress.

There is no connection to the mains water supply for the quarry activity. All water for the site is sourced from groundwater wells, GW 1 and GW2. Water is stored in a single 30 m^3 stainless steel buffer tank. There is no water treatment carried out at the site, but wells undergo regular testing. GW1 is the primary groundwater supply, while GW2 provides back up supply. Water is used for dust suppression, 806 grade fill wetting, quarry office drinking water and quarry office toilets.

The quarry office toilets discharge to a settlement tank located within the service area boundary, east of the office and south of the diesel generator. The tank contents are regularly pumped out and removed by a licenced operator to a licenced facility.

There is no mains connection to the electrical grid for site operations. Electricity for the quarry office and lime production is supplied from an onsite 200kW diesel generator. The generator is fuelled from an adjacent 1,000 litre double skinned steel diesel tank.

2.3.2.4 Environmental Management

Environmental Management at the site is carried out in compliance with legal requirements and under the conditions of previous planning applications 15/5484 and 21/5792. These planning decisions provide general obligations for the site to maintain various aspects of the environment and amenity of the site and surrounding area, as well as specific requirements for the monitoring of potential impacts from the quarrying activity.

An environmental noise monitoring programme is in place of the assessment of noise amenity at noise sensitive receptors in the vicinity of the quarry activity. Noise monitoring is carried out in the vicinity of N1 (E 171911, N 107306), N2 (E 172327, N 107632) and N3 (E 172601, N 106753). Noise monitoring is carried out quarterly.

The noise limits for the Rockmills Quarries are as follows:

Noise Limit (monitoring duration)	Applicable period
L_{Aeq} 55dBA (30 minutes)	Quarry operating hours (07:30hrs – 18:00hrs Mon-Fri 07:30hrs-16:00hrs Saturday)
L_{Aeq} 45 dBA (15 minutes)	Any other time

Each blasting event is required to be monitored at the boundary of the quarry. Blasting operations are limited to within the hours of 09:00 hrs to 18:00 hrs Monday to Friday, excluding public holidays, bank holidays and weekends. The frequency of blasting may not exceed 1 blast per month.

An air pressure limit of 125dB is applied to blasting activities at the site. A peak particle velocity (PPV) limit of 12 mm/s is in place for vibration at the nearest premises.

Dust monitoring is carried out at two monitoring locations on the northern boundary of the quarry extraction area, D1 (approx. E172314,N106726) and D2 (approx. E171820,N106662). Dust monitoring is carried out quarterly. A limit of 350 mg/m2 over a 30 day monitoring period is in place for the site, in accordance with the guidance document EPA (2006) Environmental Management in the Extractive Industry and German TA Luft Air Quality Standard (Bergeroff).

The site has two groundwater monitoring wells, GW1 (approx. E 172233,N 106579) and GW2 (approx. E172045,N106678). These wells are positioned on the southern boundary of the service yard and on the northern boundary of the current extraction area. Groundwater monitoring is carried out quarterly in accordance with planning conditions.

A map of current monitoring locations is provided in Appendix 2.3 of this EIAR.

Planning permission 15/5484 requires that the results of environmental monitoring be submitted to Cork County Council quarterly.

The operator is required to record all complaints, including;

- the name of the complainant,
- nature, time and date,
- actions taken to deal with the complaint,
- the results of such actions,
- the response to each complainant,
- a summary of the company's investigation and response.

There have been no environmental complaints recorded to date at the quarry activity.

2.4 PROPOSED DEVELOPMENT

2.4.1 OVERVIEW

The applicant, Denis O'Keeffe, is requesting a 10 year planning permission for continuation of an existing quarrying operation, a 4.21 hectare extension and all ancillary site works in the townland of Carrigdownane Upper, Co. Cork.

A site location map for the development is provided in Attachment 2.1 of this EIAR.

A site layout map for the development is provided in Attachment 2.2 of this EIAR.

There are no proposed amendments to the current buildings, facilities, inputs, processes or outputs at the existing quarrying activity as part of this application, other than the proposed extension of the activity boundary and extraction areas.

The proposed development would be a continuation of the current quarrying activity.

The proposed extension would continue to extract stone to a depth of 64m AOD.

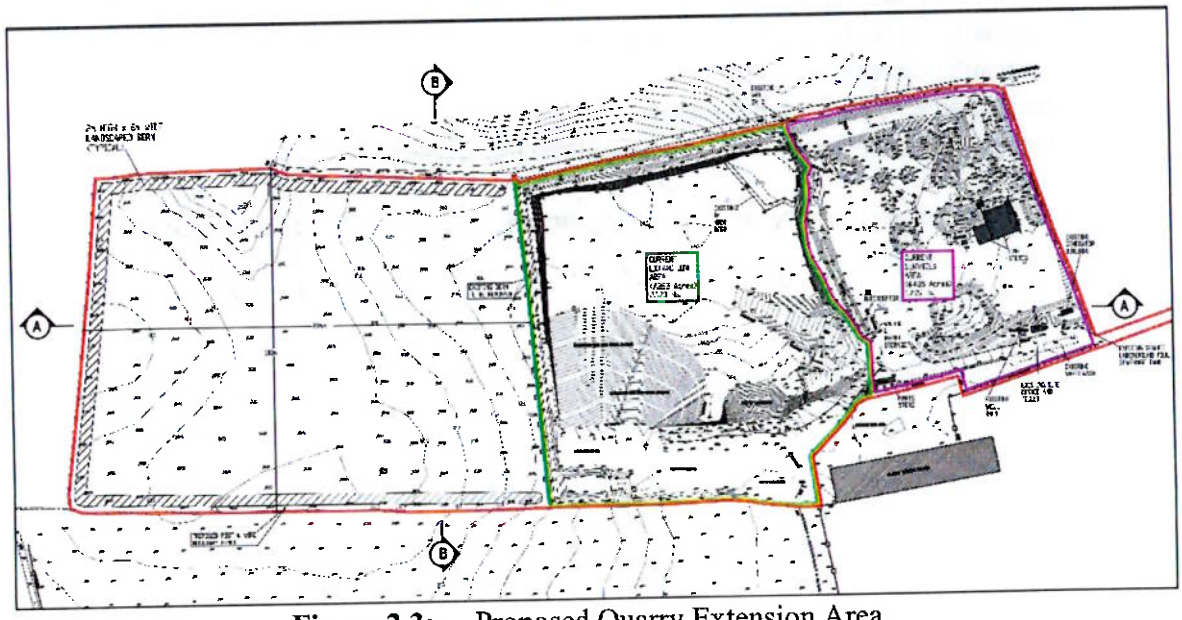

Figure 2.3: Proposed Quarry Extension Area.

The total proposed extension area is 4.21 ha, which includes proposed earth berms and boundaries.

The proposal includes 2m (high) x 6m (wide) boundary earth berms surrounding the proposed quarry extension. The berms will be planted with a double line of hawthorn whips has been planted at 1m spacing.

The volume of stone within the proposed 3.84ha extraction area, excluding boundary earth berm areas, has been estimated to be 614,400 m^3. At an estimated density of 1.8 tonnes / m^3, this would equate to an estimated reserve of 1.106 million tonnes.

The quarrying excavation operation would progress in a westerly direction from the existing quarry boundary.

Table 2.2: Proposed project phasing within Rockmills Quarry extension

Description	Timeframe (Low demand – 120,000 tpa)	Timeframe (High demand – 150,000 tpa)
Retain all existing hedgerows. Strip topsoil/overburden and create earth berms around working area. Stockpile any excess topsoil/overburden within quarry floor. Plant berms with grass for soil stabilisation. Plant berms or supplementary plant existing hedgerows with native tree species. Continue existing western working face to proposed site boundary. Implement phased restoration of extracted areas.	9.22 yr	7.37 yr
Complete Restoration plan See sub-section 2.4.2 below for details.	1 yr	1 yr
Total	10 years	8.37 years

2.4.2 CLOSURE, RESTORATION & AFTERCARE

2.4.2.1 CRA for the Existing Quarry Area

The Restoration Plan, submitted as requested further information (RFI) on planning application 15/5484, has been updated to accommodate the proposed development. This updated Restoration Plan has been submitted with the current planning application. as shown in **Figure 2.4** below.

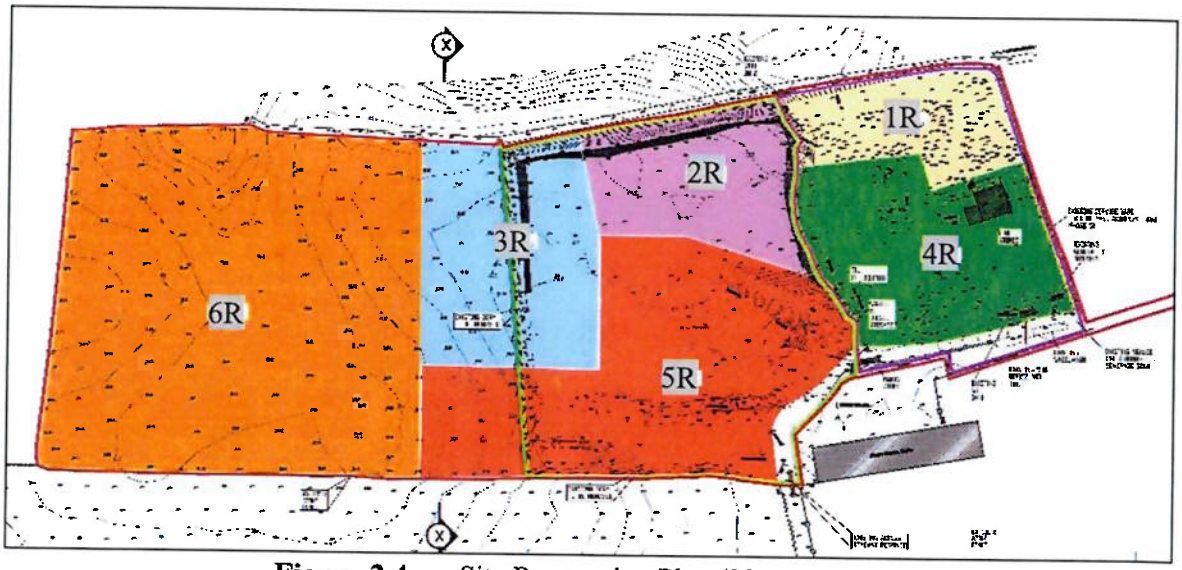

Figure 2.4: Site Restoration Plan (221099-P06).

Previous and current trial digging has found overburden depths of 500mm to 1000mm across the proposed excavation areas. Assuming an average overburden depth of 750mm, the following estimated quantities of overburden would be available for reinstatement:

Table 2.3: Estimated stockpiled overburden volumes

Phase	Area (ha)	Overburden Volume (m3)
Existing Areas	4.718	35,385
Proposed Extraction	3.84	28,800
Total	**8.558**	**64,185**

It is noted that, in addition to the above stored overburden, some of the extracted stone is not of a sufficient commercial grade. This material is also stored onsite and would be used in the restoration of the site. It is also noted that some of the existing removed overburden has been used to create berms on the boundaries of the extraction area, which would remain in place.

The area designated as 1R would be restored to pasture. The restored area would be seeded with perennial ryegrass and clover as soon as conditions allow. There would be a minimum 1m depth of topsoil and subsoil over the floor of the quarry. A 2m (high) x 6m (wide) boundary earth berms would be established on the boundary of the restored pasture area to prevent runoff to exposed rock on the floor of the quarry.

The area designated as 2R, within the existing extracted floor of the quarry, would be restored to promote the development of mixed habitats through natural regeneration. Areas of restored soil cover (minimum 1m depth) and rock rubble would be created and sectioned off from the operating quarry area. A tracked excavator would be used to compress an area of the restored soil habitat to provide an area of wetland / periodic wetland habitat.

For the proposed new extraction application, the area designated as 3R would also be restored to mixed habitats. The area designated as 6R would be retained as bare stone habitat. If material is available onsite (i.e. excess waste stone or soil) the maximum area possible would be restored with a minimum 1m of soil with sloped stone rubble verges. Therefore, 3R mixed habitats would extend into the 6R area along the northern boundary, in so far as available materials allow.

Figure 2.5: Examples of rehabilitation of quarries by natural regeneration.

The approach would allow for the establishment of pioneering flora of local provenance and would provide some open spaces required for foraging, whilst providing some cover for a variety of species.

Table 2.4: Restoration Timetable and Details

Year	Restoration Phase	Restoration Area (ha)	Quarry Area (ha)	% Total Restored Area	Notes
2024	1R	0.516	2.923	17.65%	Restored to pasture
2024-2025	2R	0.713	2.923	42.06%	Restored mixed habitats
2031	3R	1.036	6.763	33.50%	Restored mixed habitats
2031	6R	3.322	6.763	82.62%	Bare stone habitat retained

It is noted that the area within the quarry would not be restored to agricultural use. Therefore, the requirement under PL 15/5484 condition to provide a minimum of 1m of soil in restored areas may not be required for the protection of groundwater from agricultural activities within the proposed extension area. If agreed with the council, the depth of soil over the restored area may be reduced while ensuring adequate cover for establishment of trees and other species. If this is permitted, the entirety of 6R could be restored to mixed habitats.

The current restoration plan reserves the areas designated 4R (services yard) and 5R (ramp, quarry equipment and stockpile) areas for potential future extension planning permission.

In the event that the operator does not apply for any future quarry extensions, or future planning permissions are unsuccessful, the following would be carried out on final cessation of quarrying activities;

1. Removal of all plant and machinery.
2. Ripping up of any hardcore or concrete surfaces to a depth of 300mm,
3. Fill in with clean stone or remove any sub surface tanks,
4. Re-spreading and grading of any remaining stone / overburden / topsoil materials available on site.

All the work would be carried out by front loaders and excavator, including soil / stone movement and soil preparation. No separate planning permission or waste permit would be required to complete the site restoration plan as no soils or other material will be imported.

not the case

2.4.2.2 Objectives and Measures for the Promotion of Biodiversity during Restoration

Reinstatement Objectives

The development of the quarry extension will result in the loss of habitat for certain floral and faunal species but will provide habitats for other species. For example, there will be a nett loss of grassland habitat during operation, however there will additional habitat provided for the protected species which utilise active quarries such as Sand Martin, Peregrine Falcon, amphibians etc. The objective during reinstatement is to restore some of the habitats that will be removed by the proposed development whilst retaining important habitats which developed during the operation of the quarry. This will require active management of the existing quarry and proposed extension area during the reinstatement process and in subsequent years.

The key objectives are as follows:

1. Natural recolonisation is generally preferred to large scale planting.
2. Control of invasive species on an ongoing basis.
3. Specific measures that are targeted towards certain key ecological receptors including, Sand Martins, Badgers and bats.
4. Maintenance/restoration of commuting routes/green corridors in the context of the wider landscape
5. Provision of new habitats.

Specific Measures

Quarry faces

Due to the geological nature of the North Cork landscape, high rocky vertical cliffs are largely confined to the coast and are patchy distributed in higher mountainous areas. Cliffs in quarries can therefore be important ecological elements in the wider landscape. Following decommissioning, there will be multiple faces of different heights within the quarry and along its boundary. It proposed that these faces will be fenced to ensure they do not create a hazard and will be left largely intact. The faces are not visually intrusive in the context of the local landscape and will naturally become colonised by vegetation over time. Such faces can provide nesting habitat for birds including ravens, peregrine falcons, etc.

Recolonisation and additional planting

It is noted that some planting of specific areas is proposed as detailed below. However, in general natural recolonisation will be allowed to proceed. This will ensure that such areas are colonised by a mixture of native species from the surrounding landscape. These species will be appropriate to the local conditions. In general the use of wildflower mixes and extensive planting in not recommended, as natural recolonisation is considered a more effective means of revegetating a disturbed site.

New planting is recommended along external boundaries where is also serves a screening function. This will also provide enhanced foraging habitat and green corridors for bat and birds.

Tree planting

With respect to habitat enhancement the existing ecological characteristics of the site are of relevance. It is noted that groups of trees have much greater wildlife value than isolated individual trees particularly on exposed sites such as this one. Groups of trees create shelter and their own micro-climate, which does not occur with individual trees. Groups of trees also provide a range of food sources for invertebrates as well as cover for fauna and a range of nesting habitats. Groups of trees with a linear structure, such as hedgerows, treelines or bands of woodland, provide commuting routes which allow fauna to move through the landscape under cover. Woodland edge can also provide high quality feeding habitat for birds and bats.

Natural woodland has a complex structure with a mix of different layers at different heights and which are subject to different light regimes. This structure of canopy, sub-canopy and shrub layer can be replicated by including a suitable mix of species which grow at different rates and which reach different heights at maturity. It is also important to plant sufficient trees to allow dense cover to develop in certain parts of the site. It is noted that areas of cover within which there is little disturbance, even if such areas are small, can be important for open exposed sites and sites with a high degree of human disturbance. For example, they provide areas where mammals can safely hide during the day. Such areas can be developed by ensuring that paths are naturally diverted away from certain identified areas which can then be allowed to develop a denser vegetation.

The use of native trees is considered very important in increasing the ecological value of a given site. For example, native willow can support over 200 species of insect, a non-native conifer such as Leyland Cypress will support very few. The incorporation of a range of native species which flower and fruit at different times can help to support invertebrate species at different stages of their lifecycle and will also help to create a natural woodland structure.

Planting details:

- All works around trees to be carried out in accordance with British Standards for Tree protection BS 5837:2012 which details protection measures for the root zones of trees.
- All trees and shrubs to be supplied and planted following B.S 3936.
- All existing vegetation except for trees and hedgerows shown as retained to be removed and cleared of site.
- Shrub planting beds to be 450mm good quality topsoil to BS 3882
- Tree pit shall be excavated not more than 2 days prior to planting.
- All tree pits to maintain horizontal base and vertical sides, sides to be scarified, pit bottom to be broke up to a depth of 200mm with slightly raised centre.
- Trees to be planted upright with collar at finished soil level and back filled with previously prepared planting material.
- All new trees should be staked using a short double timber staking system mature relocated trees to be guyed where required.
- Planted trees to be protected from rabbits with 0.6m length spiral tree guards supported by bamboo canes. where required.
- Native trees will be of Irish origin and preferably of local stock

Time scale for implementation:

- Deciduous trees and shrubs - Late October to late March
- Herbaceous plants: September/October and March/April

The following planting scheme is proposed:

Proposed planting scheme

Species		Approx. Spacing	Size	Percentage	Notes
Woodland planting					
Alder	*Alnus glutinosa*	1m	bare root (120-150cm high)	30%	All plants to be of Irish origin.
Willow	*Salix sp.*	1m	bare root (120-150cm high)	15%	
Sessile Oak	*Quercus petraea*	1.5	bare root (120-150cm high)	10%	
Scots Pine	*Pinus sylvestris*	1.5	bare root (120-150cm high)	5%	
Hawthorn	*Craetagus monogyna*	1m	bare root (120-150cm high)	10%	
Hazel	*Corylus avellana*	1m	bare root (120-150cm high)	10%	
Birch	*Betula pendula,*	1m	bare root (120-150cm high)	10%	
Spindle	*Euonymus europaeus*	1m	bare root (120-150cm high)	2.5%	
Crab Apple	*Malus sylvestris*	1m	bare root (120-150cm high)	5%	
Guelder Rose	*Viburnum opulus,*	1m	bare root (120-150cm high)	2.5%	

Aftercare programme

A 5-year aftercare programme will be implemented. Any plants which die, are removed or become seriously damaged or diseased within a period of five years from the completion of the development shall be replaced within the next planting season. The efficacy of rabbit/hare control measures will be assessed on an ongoing basis. Weed control should not be necessary in Years 1 or 2, however in year 3 some hand weeding may be required. The use of herbicides is not recommended in immediate proximity to the newly created watercourse. Thinning of trees may be required in year 3. The objective is to have a base of healthy, mature trees.

Aquatic Habitats

As a biodiversity enhancement measure and to provide habitat for amphibians, an ephemeral wildlife pond has been incorporated into the reinstatement design. This will be designed in line with the provisions outlined in the *Amphibian Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth* (Baker et al. 2011). This will hold water during periods of heavy rainfall and will provide potential habitat for Common Frog and for a range of aquatic flora and fauna including macroinvertebrates. Natural recolonisation by emergent plants, beginning at the margins will soften the edges of the lagoons creating a natural looking feature which will not be visually intrusive. From a biodiversity viewpoint, these lagoons have the potential to provide habitat for a range of fauna including aquatic macroinvertebrates and for a range of bird species.

The sediment within lagoon will become naturally vegetated and result in areas of open water, with woodland along its periphery. Small, vegetated, lowland ponds are not common in the wider landscape and therefore the lagoon will provide valuable local habitat.

Sand Martin

Sand martins are listed as a bird of medium conservation concern by Birdwatch Ireland. These birds often breed on exposed banks especially within sand and gravel quarries.

While the overall site remains active, there is potential to create habitat for Sand Martin within the active quarry areas (existing and proposed).

However, once quarry operations are complete, the management plan will move to a new phase involving habitat creation. This will involve the creation of artificial habitat for Sand Martin to ensure that Sand Martin can continue to nest at the reinstated quarry once extraction activities have ceased. In order to facilitate this, the applicant will set aside an area of habitat for artificial nesting habitat.

Rohrer et al. (2019) carried out a case study on the use of Sand Martins of restored and managed habitats within a quarry sites. This study found that Sand Martins preferred more surface of water bodies, shorter distances to flowing water, older sites and extraction sites which produce aggregates instead of cement. At the colony scale, Sand Martins preferred southwest orientations, and stockpiles to vertical extraction faces. At the burrow scale, the birds preferred the most vertical areas of the face. Simple interventions can enhance habitat quality and conservation of cliff-nesting birds. Anti-predator skirts can also be used on the base of artificial structures as required.

The proposed artificial habitat creation will take place within the existing quarry. At the cessation of extraction works in this area, a cliff of approximately 3m high will be retained. Based on an assessment of the existing Sand Martin nesting habitat at the site, the proposed cliff length will be 50m. This cliff face will be graded (as per guidelines described above). Polythene pipes (>6mm diameter) will be placed or drilled into the cliff face and stabilized using a dry concrete mix. This will create a more permanent structure which needs limited maintenance. The following management and monitoring measures will also be implemented:

- Treat the face so that it is perfectly vertical before each breeding season;
- The vertical face must reach the ground in order to prevent access by predators;
- Avoid disturbance related to extraction activities close to colonies;
- Eliminated the vegetation that might grow near or on the faces;
- A protective mesh will be placed around the base to prevent access by rabbits.

It is essential to determine whether the actions have been successful and monitor the Sand Martin populations at the quarry.

1. Determine colonisation success of the alternative breeding stocks/faces; count the number of excavated nests at the beginning of the season (note that later in the season is not as effective as breeding adults may excavate new holes for a second clutch);
2. Determine whether the colony has had breeding success.
    - Approximately 1 month after the breeding season has begun, chicks will be visible at the at the entrance holes;
    - Once the colonies are abandoned (September to October) count the nests with signs of frequent use; the sand around the entrance of the nest will be eroded, nest material can be seen (feathers, small twigs) and droppings will be visible at the entrance to the nests and
    - Look for signs of predation.

Bats

The landscape plan provides additional native woodland on a berm which runs along the periphery and this will provide additional foraging habitat as these trees mature. Natural recolonisation will allow woodland habitat to develop over time which will provide foraging and commuting habitat for bats at this matures.

Key bat foraging areas are likely to be located along internal boundary hedgerows/treelines within the extension area. The trees within the site boundaries lack the structural elements that would make them suitable for roosting bats. Therefore, the provision of bat boxes suitable for the species recorded within the site are recommended. Examples of same are listed below. The boxes have been selected to provide a range of roosting opportunities for different species and colony sizes. In general, they can be sited on existing trees, however the pole mounted bat boxes will be used where necessary. The boxes will be installed by a supervising ecologist considering relevant factors including foraging resources, commuting routes, future landscape development, and lighting and will be regularly checked for usage as part of an ongoing ecological monitoring programme.

Vincent pro bat box

Improved Roost-Maternity Bat Box

Bat Box 1FD

Bat Colony Box 1FS universal

Vincent Pro Bat Box
Five Vincent Pro bat boxes will be provided. This box features three vertical chambers of different sizes, providing ideal roosting space for a variety of species. Beneath the crevice entrances is a ladder which provides a rough surface for bats to land. Limited cleaning is required for these boxes as the droppings will fall out of the bottom of the chambers. The front and top of the box are black which helps the box to absorb heat.

This bat box can be used by Leisler's, Common Pipistrelle, Soprano Pipistrelle, Brown long-eared, Natterer's and Whiskered Bat.

Improved Roost-Maternity Bat Box
Two improved Roost-Maternity Bat Box will be provided. This box is suitable for larger roosts or maternity groups of the small crevice-dwelling bats such as pipistrelles. This has three separate crevices, each with different temperature characteristics and a wide entrance with accurately sized opening. Ideal for Pipistrelles and deters unwelcome birds etc. Internal ceramic heat sinks ensure improved temperature stability in crevices.

Bat Box 1FD
Two Bat Box 1FD will be provided. Suitable for Pipistrelle and Nathusius' Pipistrelle Bats as well as Daubenton's Bats and Long-Eared Bats. This is especially in mixed bat zones and for initial settlement attempts. The front panel can be removed for inspection and cleaning.

Bat Colony Box 1FS universal
Two Bat Colony Boxes (1FS Universal) will be provided. This type of box is readily used for forming large colonies, by Daubenton's Bats and Brown Long-Eared Bats. Nursery roosts with between 70 and 100 animals are common. Thanks to the large interior and the integrated clinging options, for large numbers of individuals, this type of box is very attractive for forming nursery roosts and for rearing young. The box is suitable as a summer and temporary roost.

Badger

Some foraging Badger was observed near the southern boundary of proposed extension area. However, no active setts were recorded within the proposed extension area or in immediate proximity to it. Grassland habitat which has the potential to provide foraging habitat for Badger will be removed during the proposed expansion of the quarry. However, it is noted that foraging activity was confined to a small area close to the external boundary.

Badgers preferentially forage within grassland and woodland habitat. Availability of grassland habitat in not a limiting factor within the wider landscape. As woodland matures within the proposed development site and extension area, it will provide foraging habitat for Badgers, which is comparable to the areas of grassland that were removed. Prior to the closure of the quarry, a detailed survey will be carried out to determine the usage of the site by Badgers. If any changes of Badger social groups are recorded, then the restoration plan will be modified accordingly to ensure the impacts on badgers are minimised.

Invasive Species

A detailed invasive species management plan (ISMP) will be submitted prior to closure based on up to date survey data. This will ensure that all high-risk invasive species are completely removed from the existing quarry and proposed extension area. No impediment to the removal of these species within the landholding, as part of a detailed invasive species management plan, have been identified.

Additional measures

The applicant will clearly define the management responsibility for the site restoration work. The supervising ecologist will draw up a management plan for the aftercare of the site following closure.

A survey for invasive species will be carried out prior to closure and a site-specific invasive management plan will be prepared and implemented if required.

Sand Martin nests within the existing quarry and vertical sandy faces will be identified by the supervising ecologist which are suitable for nesting. These faces will be preserved.

Successful reinstatement programme will include as much naturally colonising vegetation as possible, as such vegetation (a) allows a head start, (b) reflects the native flora and (c) provides local flora and fauna banks to enhance ecological value.

2.4.2.3 Potential Future Development effecting CRA

It is planned that, assuming approval of the current planning application and on approaching the end of the 10 year permission, the applicant would apply for a further quarry extraction area extension on the southern boundary of the site. Any such extension would be subject to negotiation and agreement with this third-party landowner prior to the planning application.

While the exact area and geographical extents of this potential future extension application cannot be defined at this stage, some site management and restoration principals can be outlined. The existing services area and stockpiles area would be retained for continuation of the new extension, with all current management and mitigation measures in place. Waste stone and stockpiled overburden from the new extraction area would be used for the creation of natural habitats within the 6R area, combining with existing restored areas.

The applicant has previously investigated the possibility of carrying out the infill of inert construction and demolition material within the excavated areas of the quarry. Following review of this option, it was considered that space and storage area constraints would not make this a practical option while the quarrying operation is active at this site. At this time, the applicant is not considering any infilling operations at the permanent closure stage of the quarry.

3.0 ALTERNATIVES

3.1 EXAMINATION OF POSSIBLE ALTERNATIVES

Schedule 6, Article 94 of the Planning and Development Regulations 2001 requires that:

Information to be contained in an Environmental Impact Statement shall include –

(1d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

It is recognised within both the Act, the Guidelines and Draft Guidelines on the Information to be contained in EIAR produced by the EPA August 2017 reflect the requirements of the Directive in that:

*'A description of the **reasonable alternatives** studied by the person or persons who prepared the EIAR, **which are relevant** to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.'*

Indeed, the Guidelines recognise at paragraph 4.13 that:

"*For example, some projects may be site specific so the consideration of alternative sites may not be relevant.*"

This chapter investigates the following alternatives to the proposed development:

- Alternative Location.
- Alternative Layout and Design.
- Alternative Process.

3.2 ALTERNATIVE LOCATION / ROUTE

The proposed development is for the continuation and extension of an existing quarrying operation and all ancillary site works in the townland of Carrigdownane Upper, Co. Cork.

As sources of aggregate of proven quality are a finite resource, the siting of a new quarry must look at a range of environmental and commercial issues, including:

- The presence of the required quality of aggregate;
- Contamination with other rock or soils;
- Depth of aggregates below surface;
- Presence of groundwater;
- Presence of existing processing infrastructure;
- Access to necessary haulage routes/transport options, and;
- Proximity to markets.

Therefore, the proposed continued operation and lateral extension of the Rockmills Quarry was deemed the optimal option for the following reasons:

- It has a proven presence of the required quality of aggregate;
- The site has existing infrastructure and services to support the activity;
- the aggregate can be accessed due to its relatively shallow depth below the surface and without dewatering;
- the site is close to the established haulage routes/transport options close to the local markets.

Any new green field development of a limestone quarry require higher resource use for the establishment of a working yard and services, and additional potential environmental impacts at a virgin site.

3.3 ALTERNATIVE LAYOUT, DESIGN & PROCESSES

Variations to the layout that were considered during the design of the proposed development included the positioning of embankments on the boundary, the type of planting of shrubbery, trees and grass on the boundary earth berms, the location and extent of extraction area extensions including the proximity to residential dwellings.

As part of a previous incomplete planning application, a further extension area on the southern boundary of the current quarry was included. This additional extension was removed for the current application as a matter of total product and extraction rates within the proposed 10 year planning permission.

The operation of this limestone quarry is a well-established process, with existing plant layout and mitigation infrastructure. Additional mitigation design, infrastructure and practices have been considered as part of this assessment and are outlined within the following chapters.

3.4 "DO NOTHING" ALTERNATIVE

Should the proposed development not be permitted, the current 10 year planning permission (15/5484) would lapse in 2025. Onsite operations, including noise and vibration characteristics, would continue within this time frame until the available stone resource is exhausted. The current restoration plan would be implemented, resulting in restored pastureland in the upper yard area. Within the quarry floor, the biodiversity value of the site would improve with the restoration to mixed habitats developing through natural regeneration.

The "do nothing" alternative would result in impacts to the local economy through a direct loss of employment and competition in the aggregate supply sector, unless other reserves are sourced.

In order to replace this proposed aggregate source, and to meet market demand, other similar developments in green field areas would be likely. This would be likely to cause higher resource use for the establishment of a working yard and services, and additional potential environmental impacts at a virgin site.

PART II - ENVIRONMENTAL IMPACTS

This section of the EIAR describes the likely significant environmental impacts arising from the proposed continuation and extension of an existing quarrying operation and all ancillary site works in the townland of Carrigdownane Upper, Co. Cork.

Where possible, design measures have been included to reduce or eliminate possible impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

SECTION A - HUMAN ENVIRONMENT

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed scheme on human beings.

These effects have been grouped into:

Population and Human Health

The potential for impacts to the local and regional economy, population dynamics and human health from the proposed development.

Air Quality & Climate Impacts

The impact of emissions to air generated by the proposed development.

Noise & Vibration Impacts

The impacts generated by the proposed development on noise and vibration levels in the general vicinity has been assessed.

Landscape and Visual Impacts

The impact of the proposed development on the visual amenity of the landscape has been assessed.

While human beings interact in some way with every aspect of the environment, the above interactions are considered the most significant in this case. The impacts of the proposed development on human beings in relation to effects on the natural environment are further considered in **Section B**, while the impacts of effects on archaeology, architecture, and cultural heritage and material assets are considered in **Section C** and **Section D** respectively.

4.0 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

Any development that alters the existing environment has the potential to impact upon human beings at a local and / or regional scale, through impacts upon socio-economic factors including demographics, land use, economic development and employment.

This chapter of the EIAR provides an overview of the receiving social-economic environment of the area and on non-agricultural properties including residential, commercial, recreational and non-agricultural land, while briefly outlining the main potential impacts of the proposed development, at both the construction and operational phases, on human beings. The following sub-sections provide detailed assessments of potential impacts to human beings and detail proposed mitigation measures to address the identified impacts.

4.2 METHODOLOGY

A study was undertaken to assess the potential impact of the proposed development on the receiving socio-economic environment, residential and commercial properties, in addition to recreational and non-agricultural lands in the area. This study comprised a review of available information with regards population and dynamics, economic activity, employment, land use and residential amenity. Information was obtained from Central Statistics Office (CSO), EPA licensing information and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, CORINE land use mapping, EPA Envision, myplan.ie and the Cork County Development Plan 2022-2028.

4.3 DESCRIPTION OF EXISTING ENVIRONMENT

4.3.1 POPULATION AND DYNAMICS

While a new census was completed in 2022, detailed results were not available as of writing this report.

According to the 2016 Census, County Cork had a population of 417,211. This represents a population increase of approximately 4.2% from 399,802 since the previous Census in 2011.

The proposed development is located within the Derryvillane Electoral District (ED), which had a population of 492 during the 2016 Census.

4.3.2 ECONOMIC ACTIVITY & COMMERCIAL ENTERPRISES

The Department of Agriculture, Food and Marine (DAFM) reports that the agri-food sector is Ireland's largest indigenous industry, contributing €26 billion to the national economy in 2015, employing 8.4% of the working population and accounting for 10.7% of Ireland's exports. The DAFM's report, *'Food Wise 2025'*, identifies further growth opportunities for the sector, with the aim to position Ireland as a world leader in sustainable agri-food production.

Ten facilities licenced by the EPA are located within 10km of the development site, comprising various *'Intensive Agriculture'* activities.

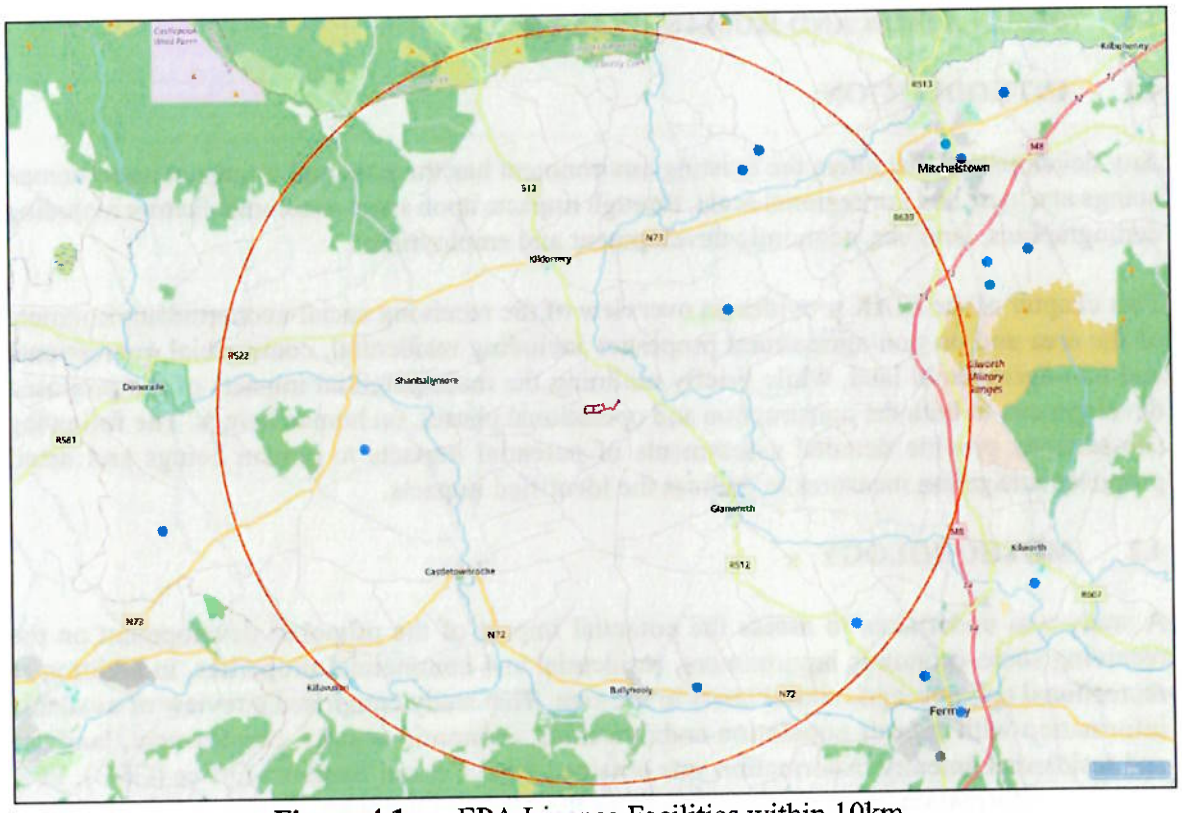

Figure 4.1: EPA Licence Facilities within 10km

Table 4.1: EPA Licenced Facilities within 10km Proposed Development

Licence No.	Licence Name	Licence Type (First Schedule of EPA Act, 1992, as amended)	Approximate Distance from Proposed Site
P0413	Mr Patrick OKeeffe	6.2(b) Intensive agriculture	4.00 km NE
P0387	Leamcar Limited	6.2(a) Intensive agriculture	5.62 km W
P0396	Derra Farms Limited	6.2(b) Intensive agriculture	7.10 km NE
P0374	Mr Conor O'Brien	6.2(b) Intensive agriculture	7.20 km NE
P0896	Mr Liam OConnell	6.1(a) Intensive agriculture	7.57 km S
P0891	Mr Kevin Ahern	6.1(a) Intensive agriculture	8.56 km SE

A number of small-scale agricultural and commercial enterprises are located within the vicinity of the proposed development, as shown in **Figure 4.3**.

4.3.3 EMPLOYMENT

The total labour force for 2016 in County Mayo was 196,350 individuals, which represents 47.1% of the total population of 417,211.

Table 4.2: Persons at Work by Occupation 2016

Occupation	Total No. People	% of Workforce	% of Population
Managers, Directors and Senior Officials	14,784	7.5%	3.5%
Professional Occupations	35,269	18.0%	8.5%
Associate Professional and Technical Occupations	21,858	11.1%	5.2%
Administrative and Secretarial Occupations	18,440	9.4%	4.4%
Skilled Trades Occupations	33,961	17.3%	8.1%
Caring, Leisure and Other Service Occupations	14,365	7.3%	3.4%
Sales and Customer Service Occupations	13,076	6.7%	3.1%
Process, Plant and Machine Operatives	16,303	8.3%	3.9%
Elementary Occupations	14,782	7.5%	3.5%
Not stated	13,512	6.9%	3.2%
Total	196,350	100.0%	47.1%

4.3.4 LAND USE AND SETTLEMENT PATTERNS

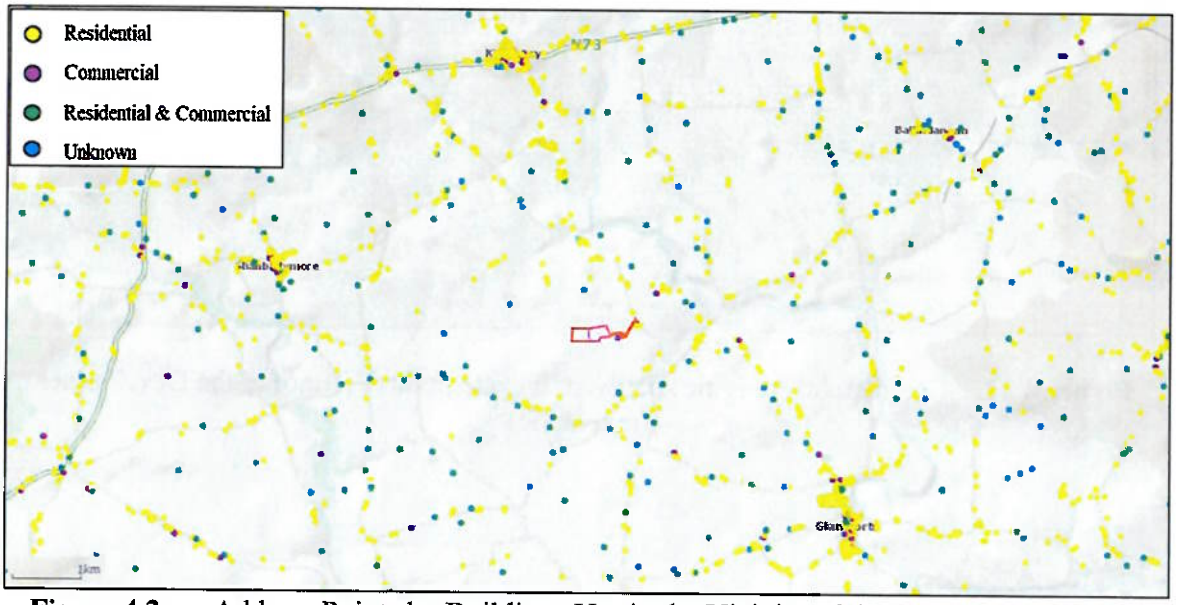

Figure 4.2: Address Points by Buildings Use in the Vicinity of the Project (myplan.ie)

The proposed development would be located within the townland of Carrigdownane Upper, Co. Cork. The site is located approximately 1.2 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of

Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads, as well as some commercial developments, are also located within the area.

Figure 4.2 shows the address points of properties within the vicinity of the proposed development. Points in yellow represent residential properties, points in purple represent commercial only properties, points in green represent properties accommodating both residential and commercial uses while points in blue are unknown.

As can be seen in the figure below, the majority of development within the vicinity of the proposed development are residential properties and properties accommodating both residential and commercial uses.

Figure 4.3 below shows commercial properties categorised per NACE Code, a pan-European classification system, in the surrounding area of the proposed development.

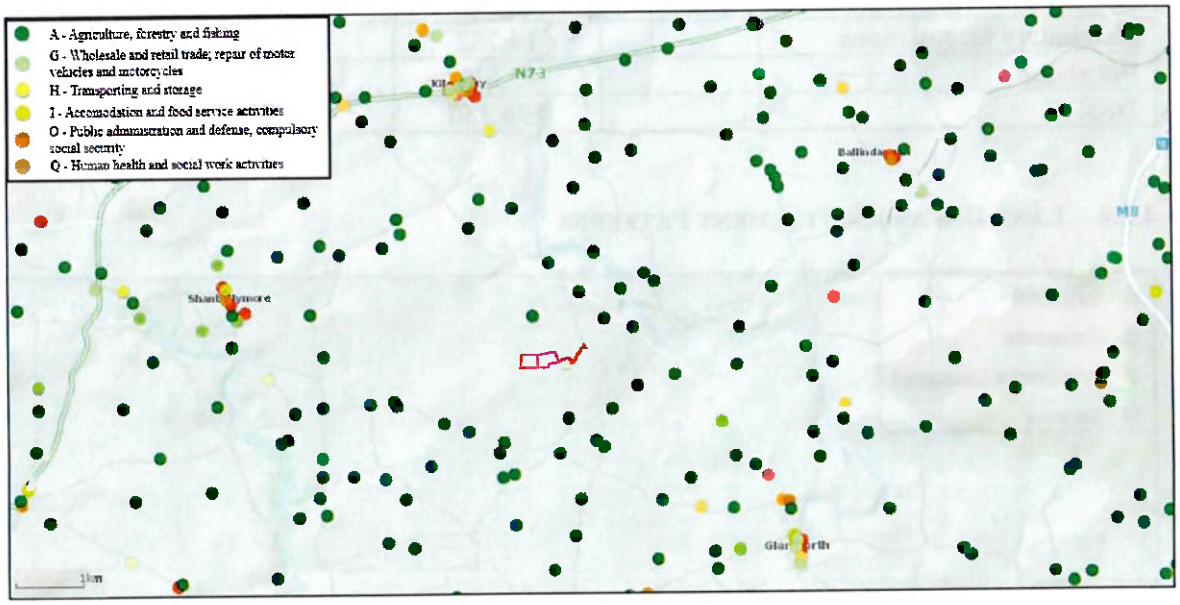

Figure 4.3: Commercial Activities per NACE Code in the Vicinity of the Development (myplan.ie)

4.3.5 COMMUNITY AND SOCIAL INFRASTRUCTURE

Community infrastructure within the vicinity of the proposed development would be primarily located within the village of Killdorrery, c. 4km north of the site.

The nearest settlement (approximately 1.25km north) to the proposed development is Rockmills village. Community infrastructure includes St. Nathlash church (remains) and cemetery

Killdorrery village contains community services including, St. Bartholomew's Church, community centre, national school, GAA Club, Kildorrery Village Park, shops and public house.

Community infrastructure within Mitchelstown, Fermoy and Mallow towns would include a number of schools, churches of different religions, medical centres, a library, restaurants, supermarkets, shops, banks, visitor accommodation and businesses.

4.4 IMPACTS

A brief overview of the potential impacts upon human beings and human health is provided below. More detailed assessments in relation to specific topics associated with human health are discussed in the following chapters of this EIAR.

4.4.1 ECONOMY AND EMPLOYMENT

The proposed development would have a positive impact upon the local economy by providing a continuation of the current employment for the duration of planning permission. The site provides employment for approximately 18 to 22 personnel, depending on demand (3 administrative staff, 3 to 4 operators and 12 to 15 drivers).

The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the Killdorrery area and surrounds.

The proposed development would allow for the continued operation of the Rockmills Quarry, extracting an economically valuable material for sale.

4.4.2 AIR QUALITY

An assessment of the potential air quality and climate impacts arising from the proposed development are discussed in detail in **Chapter 5.0** of this EIAR.

The potential for dust generation during construction, operational and restoration works could potentially impact upon the community and residents within the vicinity. However, the set back distances from the activity significantly reduces the likelihood of amenity or health effects at human receptor locations. Dust control measures would be implemented throughout the project to reduce the potential for impacts. Current mitigation measures for dust control are outlined in **section 2.3.2.2** and proposed mitigation measures are outlined in **section 5.6**.

4.4.3 NOISE & VIBRATION

Noise generated from the proposed development has the potential to impact upon human beings within the vicinity of the site. An assessment of potential impacts upon human beings due to noise associated with the proposed development is discussed in **Chapter 6.0**.

It is noted that, as a continuation of existing quarrying operations and at existing extraction rates, it is not expected that there would be a significant change to the current noise environment of the area.

Baseline monitoring and predictive noise calculations have determined that the proposed development would have no noise impacts at sensitive receptor locations. All noise levels were found to be in compliance with the EPA recommended and 15/5484 Planning Condition daytime noise limit of $L_{Aeq,T}$ 55 dB.

Noise and vibration monitoring of blast events has determined that the site is in compliance with the 15/5484 Planning Conditions for blasting activities.

Control and mitigation measures to reduce the potential for noise and vibration are outlined in **Chapter 6.0**.

4.4.4 TRAFFIC

A road and traffic survey report has been prepared by Murphy McCarthy Consulting Engineers for this development, has been included as **Attachment 12.1** with the application and is summarised within **Chapter 12.0** of this EIAR.

The max two traffic loading is expected to be approx. 40 pcu's / hr. This is significantly below the guideline 550 passenger car units per hour (pcu/hr) capacity of the local road network.

There would be anticipated to be no significant traffic or transport impacts from the proposed development.

4.4.5 LAND-USE

The soil excavated during removal of overburden would remain onsite to be used as material during the rehabilitation phase. Under the current planning permission (PL 15/5484), 0.516ha of the current quarry would be returned to pastureland. 0.713 ha would be rehabilitated to mixed habitats. Under the current proposed quarry extension, 1.036ha would be rehabilitated to mixed habitats, however, this may increase based on availability of overburden and waste stone. 3.332 ha would remain fallow as bare stone habitat.

There would be a permanent negative impact on soil cover and pastureland from the development. As the agricultural land and farming operation is in the ownership of the applicant, it is considered that the economic benefit of the quarrying operation would offset the economic loos of the agricultural pastureland.

However, there would be a benefit in terms of the creation of new mixed natural habitats within the predominantly pastureland area.

4.4.6 VISUAL AMENITY

Within the 4 km study area, the landscape is composed of gently undulating hills and ridgelines reaching from valleys of approximately 70m AOD to rises of 80-100m AOD.

The proposed site is located on the northern slope of a gentle ridgeline, oriented approximately east -west. The existing and proposed development area slopes from an approximate elevation of 85m above sea level at the southern site boundary to an approximate elevation of 74m above sea level at the northern site boundary.

Due to the undulating topography, as well as mature vegetation throughout the study area, the landscape is somewhat enclosed, providing predominantly limited views. There are however, a number of elevated locations to the north of the site where distant views open up and the scale of the landscape increases.

There would be no visual or landscape impacts to the south or west due to the hill upon with the project is located obscuring views.

During the construction phase and from northern viewpoints, there would be a moderate visual impact due to the extension of boundary earth berms to the west. However, this would be effectively mitigated through the proposed planting with grass and hedgerow on the berms, and supplemental planting of existing hedgerows. This planting would merge with the recent planting for screening of the quarry buildings and current quarry area.

During the operational phase, the majority of works would be obscured from view by the quarry faces and boundary earth berms. There would be no change to the existing visible buildings and infrastructure of the site.

Following the establishment of planting in the proposed extension and restored area, there would be an improvement to the visual impacts of the development due to the screening of internal buildings and quarry pit

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant overall long–term negative landscape and visual impact.

4.4.7 WATER

A deterioration in water quality has the potential to impact upon human beings by adversely affecting drinking water quality. Detailed assessments of potential impacts to water quality are included in **Chapter 9.0**of this EIAR.

The primary risk associated with the site would be the use of fuels and chemicals at the site, with the potential for groundwater contamination. As described in **Section 2.3.2.2**, control and management measures are in place at the site. Further control measures for the appropriate management of fuels and chemicals at the site have been recommended in **section 9.8.3**.

Due to the existing and proposed mitigation measures, it is considered that there would be no significant risk to water quality or human health from the proposed development.

4.4.8 "DO-NOTHING" SCENARIO

Should the proposed development not be permitted, the current 10 year planning permission (15/5484) would lapse in 2025. Onsite operations, including noise and vibration characteristics, would continue within this time frame until the available stone resource is exhausted.

4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS

As noted in Directive 2014/52/EU, precautionary actions need to be put in place for certain projects which, "*due to their vulnerability to major accidents and/or natural disasters (such as flooding, sea level rise or earthquakes) are likely to have significant adverse effects on the environment*".

It is not anticipated that there would be a significant risk of environmental impacts as a result of accidents during the operational phase due to the nature of activities that will be taking place (limestone quarry and agricultural lime mill).

Construction and rehabilitation works would be minor, requiring soil stripping / restoration and planting. Typical construction methods and practices would be anticipated to adequately mitigate against accidents or risks to human health.

The site does not fall within the Seveso III Regulations or European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, as no dangerous substances would be used at the site.

The proposed construction, operation and rehabilitation phase of the development would not require the storage or processing of large quantities of dangerous materials. All potentially polluting substances, including lubricants and fuels, would be appropriately stored and bunded within the site.

It is not considered that the site is at a significant risk of natural disasters.

The proposed development site is located on elevated land approximately 30 m above the River Funshion, which offers protection from a potential flood event. The site is at a low risk of pluvial or groundwater flooding. See section 9.6.2 for a discussion of flood risk at the site.

The GSI classify the proposed site as having a low susceptibility to landslides. The nearest recorded landslide events occurred at Fermoy-Ballyduff road, c.16km south-east, in 2015. A History of landslides is shown in the Galtee Mountains, c. 24 km north-east.The area is not prone to earthquakes.

Risks to human health would not be expected to change significantly as a result of the construction, operational or restoration phases of the development. There are no recorded drinking water abstractions in close proximity to the site.

It is considered unlikely that the proposed development site would be prone to natural disaster. The site is not located in an area with a history of flooding, landslide or earth-tremors.

4.6 MITIGATION MEASURES

4.6.1 HUMAN BEINGS

The following sections of this EIAR provide further information on the potential impacts to human beings as a result of the proposed development. Mitigation measures have been proposed to address the potential impacts and are detailed under the following sections:

- Air Quality & Climate
- Noise
- Biodiversity
- Land – Soils, Geology, Hydrology And Hydrogeology
- Landscape and Visual
- Material Assets
- Architectural, Archaeological and Cultural Heritage

4.7 RESIDUAL IMPACTS

There would be no significant residual impacts on human beings, residential, commercial, recreational or other non-agricultural facilities as a result of the proposed development.

4.8 DIFFICULTIES ENCOUNTERED

No difficulties were encountered during the assessment.

4.9 REFERENCES

Central Statistics Office. Available at: http://www.cso.ie/en/index.html

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EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

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5.0 AIR QUALITY & CLIMATE

5.1 INTRODUCTION

The air quality section of this EIAR describes the existing air quality setting and potential effects on ambient air quality and climate associated with the construction phase and operational phase of the proposed continuation and extension of an existing quarry, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork. The assessment methodology, existing environment, likely significant impacts and recommended mitigation measures are described in the following sections.

5.1.1 AIR QUALITY

Air quality in Ireland is of a high standard across the country and is among the best in Europe, due to the prevailing clean Atlantic air and a lack of large cities and heavy industry. Emissions of pollutants from vehicles, power stations, industry, domestic fuel burning and agriculture can have international, national, local or global effects. Emissions of carbon dioxide and other greenhouse gases are increasing the greenhouse effect and causing global warming.

This air quality study identifies, describes and assesses the impact of the proposed development within townland of Carrigdownane Upper, Co. Cork.

Particular attention has been given to sensitive receptors, such as residential areas and to the extent of the exposure of these receptors to airborne pollutants derived as a result of the development. This assessment was prepared in accordance with the EPA documents '*Guidelines on the information to be contained in an Environmental Impact Statement, 2002*' and draft '*Guidelines on the information to be contained in an Environmental Impact Assessment Reports, 2017*'.

Air quality is variable and subject to significant spatial and temporal variation. In relation to spatial variation in air quality, concentrations generally fall significantly with distance from major sources. Thus, residential exposure is determined by the location of sensitive receptors relative to major sources in the area. Temporally, air quality can vary significantly due to changes in traffic volumes, meteorological conditions and wind direction.

The main potential sources of air pollutants from the proposed development would be the burning of fuel by plant machinery during the construction and operational phases.

5.1.2 DUST

Any significant dust generation, dispersion and deposition operational activities are considered an environmental nuisance for sensitive receptors within the vicinity of a development.

During the operation of the proposed quarry extension there would be a high potential for dust generation. The generation of dust would depend upon the nature of works, mitigation measures employed and the local meteorological conditions such as rainfall, wind speed and wind direction.

5.1.3 CLIMATE

Climate can refer to both the long-term weather patterns in an area and also to localised atmospheric conditions in a given area, referred to as the microclimate. Climate has implications for many aspects of the environment from soils to biodiversity and land-use practices.

5.2 LEGISLATIVE CONTEXT

The main legislation and guidelines pertaining to air quality in Ireland is outlined below.

5.2.1 AIR QUALITY LEGISLATION AND GUIDANCE

The Environmental Protection Agency Act 1992 and 2003

The Environmental Protection Agency Act 1992 (EPA Act) and Part 2 of the Protection of the Environment Act 2003 are collectively referred to as the Environmental Protection Agency Acts 1992 and 2003. The Environmental Protection Agency Acts 1992 and 2003 provide for the management of air emissions from activities (meaning any process, development or operation) specified in the First Schedule of the Environmental Protection Agency Acts 1992 and 2003.

Section 4 (2) of the Environmental Protection Agency Acts 1992 and 2003 states that Air Pollution:

'*means the direct or indirect introduction to an environmental medium, as a result of human activity, of substances, heat or noise which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment, and includes -*

a) air pollution' for the purposes of the Air Pollution Act 1987'

The Air Pollution Act 1987 (AP Act) is 'an act to provide for the control of air pollution and other matters connected with air pollution'. According to the Air Pollution Act 'pollutant means any substance specified in the First Schedule or any other substance (including a substance which gives rise to odour) or energy which, when emitted into the atmosphere either by itself or in combination with any other substance, may cause air pollution'.

Section 4 of the Air Pollution Act states:

'*Air pollution" in this Act means a condition of the atmosphere in which a pollutant is present in such a quantity as to be liable to:*

i. be injurious to public health, or
ii. have a deleterious effect on flora or fauna or damage property, or
iii. *impair or interfere with amenities or with the environment.*'

Section 24 of the Air Pollution Act states:

1) The occupier of any premises, other than a private dwelling, shall use the best practicable means to limit and, if possible, to prevent an emission from such premises.

2) The occupier of any premises shall not cause or permit an emission from such premises in such a quantity, or in such a manner, as to be a nuisance.
3) In any prosecution for a contravention of this section, it shall be a good defence to establish that:
   a) the best practicable means have been used to prevent or limit the emission concerned, or
   b) the emission concerned was in accordance with a licence under this Act, or
   c) the emission concerned was in accordance with an emission limit value, or
   d) the emission concerned was in accordance with a special control area order in operation in relation to the area concerned, or
   e) in the case of an emission of smoke, the emission concerned was in accordance with regulations under section 25, or
   f) the emission did not cause air pollution.

Section 75 (1) the Environmental Protection Agency Acts 1992 and 2003 states:

'*The Agency shall, in relation to any environmental medium and without prejudice to its functions under section 103, specify and publish quality objectives which the Agency considers reasonable and desirable for the purposes of environmental protection.*'

Air Pollution Act, 1987

Under this act, local authorities and / or the Environmental Protection Agency (EPA) are given responsibilities relating to air quality monitoring, to the prevention of air pollution and the issuing of air pollution licences. Owners of certain industrial facilities must obtain an air pollution licence from their local authority or an Industrial Emissions / Integrated Pollution Prevention and Control licence from the EPA.

Air Quality Standards Regulations, 2011 (S.I. No. 180 of 2011)

These regulations transpose the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) into Irish legislation. The regulations specify the limit or target values for specific air pollutants including sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM_{10} and $PM_{2.5}$), lead, benzene, carbon monoxide and ozone. The EPA is the competent authority for the purpose of the CAFE Directive.

Directive set Targets for Air Quality

The following tables show the limit or target values specified by the five published directives that set down limits for specific air pollutants. The directives cover:

- Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM10 and PM2.5) and lead,
- Carbon monoxide and benzene,
- Ozone,
- Arsenic, Cadmium, Nickel and Benzo(a)pyrene

Table 5.1: Limit values of CAFE Directive 2008/50/EC

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m³	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
SO2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 Jan 2005
SO2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO2	Protection of vegetation	calendar year	20	7.5	Annual mean	19 July 2001
SO2	Protection of vegetation	1 Oct to 31 Mar	20	7.5	Winter mean	19 July 2001
NO2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO2	Protection of human health	calendar year	40	21	Annual mean	1 Jan 2010
NO + NO2	Protection of ecosystems	calendar year	30	16	Annual mean	19 July 2001
PM10	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM10	Protection of human health	calendar year	40	-	Annual mean	1 Jan 2005
PM2.5 - Stage 1	Protection of human health	calendar year	25	-	Annual mean	1 Jan 2015
PM2.5 - Stage 2	Protection of human health	calendar year	20	-	Annual mean	1 Jan 2020

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m³	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
Lead	Protection of human health	calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	1 Jan 2005
Benzene	Protection of human health	calendar year	5	1.5	Annual mean	1 Jan 2010

Table 5.2: Long-term Objectives for Ozone from 2020

Objective	Parameter	Value/Threshold
Protection of human health	Maximum daily 8 hour mean	120 µg/m³
Protection of vegetation	AOT40, calculated from 1 hour values from May to July	6000 µg/m³/h
Information Threshold	1 hour average	180 µg/m³
Alert Threshold	1 hour average	240 µg/m³

Table 5.3: Target Values of Directive 2004/107/EC

Pollutant	Limit Value Objective	Averaging Period	Target Value ng/m³	Limit Value Attainment Date
Arsenic	Protection of human health	calendar year	6	31 Dec 2012
Cadmium	Protection of human health	calendar year	5	31 Dec 2012
Nickel	Protection of human health	calendar year	20	31 Dec 2012
Benzo(a)pyrene	Protection of human health	calendar year	1	31 Dec 2012

Table 5.4: Previous EU Air Quality Standards

Pollutant	Regulation	Type	Averaging Period	Limit Value
NO_2	85/203/EEC	Limit Value	98th percentile of yearly mean hourly	200 µg/m³
		Guide Value	Concentration	135 µg/m³
		Guide Value	50th percentile of yearly mean hourly concentration	50 µg/m³
SO_2	80/779/EEC	Limit Value	98th percentile of yearly mean hourly concentration	2 µg/m³
		Limit Value	Winter (medium of daily values)	250-350 µg/m³
		Limit Value	One Year (medium of daily values)	130 0r 180 µg/m³
		Guide Value	98th percentile of yearly mean hourly concentration	80 – 120 µg/m³
		Guide Value	50th percentile of 1 hour mean	135 µg/m³
Lead (Pb)	82/884/EEC	Limit Value	Annual Mean	50 µg/m³
Smoke	80/779/EEC	Limit Value	One Year (medium of daily values)	80 µg/m³
		Limit Value	Winter (medium of daily values)	130 µg/m³
		Limit Value	98th percentile of daily values	250/m³

National Road Authority Guidelines

Although no impact criteria, as a percentage of the limits, are enshrined in EU or Irish Legislation, the National Road Authority document *Guidelines for the treatment of Air Quality during the Planning and Construction of National Road Schemes* details a mythology for determining air quality impact significance criteria for road schemes. The degree of impact is determined based on both the absolute and relative impact of the development. The NRA significance criteria have been adopted for the proposed development and are detailed in tables 5.5 – 5.7. The significance criteria are based on PM10 and NO_2, as these pollutants are most likely to exceed their limit values. However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual PM2.5 concentration for the purpose of this assessment.

Table 5.5: Definition of Impact Magnitude for Changes in Ambient Air Pollution Concentration (NRA 2011)

Magnitude of Change	Annual Mean NO2/PM10	No. Days PM10 Conc. >50 µg/m^3	Annual Mean PM
Large	Increase/decrease ≥4 µg/m3	Increase/decrease > 4 days	Increase/decrease ≥ 2.5 µg/m3
Medium	Increase/decrease 2 – <4 µg/m3	Increase/decrease 3 of 4 Days	Increase/decrease 1.25 – < 2.5 µg/m3
Small	Increase/decrease 0.4 – <2 µg/m3	Increase/decrease 1 or 2 Days	Increase/decrease 0.25 – <1.25 µg/m3
Imperceptible	Increase/decrease <0.4 µg/m3	Increase/decrease < 1 Day	Increase/decrease <0.25 µg/m3

Table 5.6: Air Quality Impact Descriptors for Change in Annual Mean NO_2, PM10 and PM2.5 Concentrations at a Receptor

Absolute Concentration in Relating to Objective/Limit Values	Changes in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Objectives/Limit Values with Scheme (≥ 40µg/m3 of NO2 or PM10) (≥ 25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just below Objectives/Limit Values with Scheme (36 – <40µg/m3 of NO2 or PM10) (22.5 – <25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objectives/Limit Values with Scheme (30 – <36µg/m3 of NO2 or PM10) (18.75 – <22.5µg/m3 of PM2.5)	Negligible	Slight Adverse	Slight Adverse
Well below Objectives/Limit Values with Scheme (<30µg/m3 of NO2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objectives/Limit Values with Scheme (≥ 40µg/m3 of NO2 or PM10) (≥ 25µg/m3 of PM2.5)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just below Objectives/Limit Values with Scheme (36 – <40µg/m3 of NO2 or PM10) (22.5 – <25µg/m3 of PM2.5)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objectives/Limit Values with Scheme (30 - <36µg/m3 of NO2 or PM10) (18.75 – <22.5µg/m3 of PM2.5)	Negligible	Slight Beneficial	Slight Beneficial
Well below Objectives/Limit Values with Scheme (<30µg/m3 of NO2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Beneficial

Table 5.7: Air Quality Impact Descriptors for Change to Number of Days with PM10 Concentration Greater than 50 $\mu g/m^3$ at Receptors.

Absolute Concentration in Relating to Objective/Limit Values	Changes in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Objectives/Limit Values with Scheme (≥35 Days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just below Objectives/Limit Values with Scheme (32 – <35 Days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objectives/Limit Values with Scheme (26 – <32 Days)	Negligible	Slight Adverse	Slight Adverse
Well below Objectives/Limit Values with Scheme (<26 Days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objectives/Limit Values with Scheme (≥35 Days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just below Objectives/Limit Values with Scheme (32 – < 35 Days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objectives/Limit Values with Scheme (26 – < 32 Days)	Negligible	Slight Beneficial	Slight Beneficial
Well below Objectives/Limit Values with Scheme (<26 Days)	Negligible	Negligible	Slight Beneficial

This air quality assessment has been carried out, following procedures in the publication by the EPA, and using the methodology outlined in the guidance document published by the UK Department for Environment, Food & Rural Affairs (DEFRA). The assessment of air quality was carried out using the phase approach recommended by the UK DEFRA. The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standard. In the current assessment, an initial scoping of possible key pollutants was carries out and the likely location of air pollution *Hot-Spots* identified. An examination of recent EPA and Local Authority data in Ireland had indicated that SO_2 smoke and CO are unlikely to be exceeded at locations such as the current one and thus these pollutants do not require detailed monitoring or assessment to be carried out.

Dust Deposition Guidelines

Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors. Construction activities such as earth excavation, moving and backfilling may generate quantities of dust, particularly in dry weather conditions.

There are no statutory limits for deposition of dust, and industry guidelines are typically employed to determine any impact. The TA Luft (German Government *'Technical Instructions on Air Quality')* states a guideline of 350 mg/m^2/day for the deposition of non-hazardous dust. This value will be used to determine the impact of residual dust as an environmental nuisance.

The National Road Authority has published guidance for assessing dust impacts from road construction, Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes.

Table 5.8 provides a list of distances that dust could be expected to result in a nuisance, from construction sites, for impacts such as soils, PM_{10} and vegetation effects. These distances present the potential for dust impacts with standard mitigation in place for construction activities.

Table 5.8: Assessing the Criteria for the Impact of Dust from Construction with Standard Mitigation in place. (National Road Authority)

Source		Potential Distance for Significant Effects from the Source		
Scale	Description	Soiling	PM10	Vegetation
Major	Large construction sites, with high use of haul roads	100M	25M	25M
Moderate	Moderate sized construction sites, with moderate use of haul roads	50M	15M	15M
Minor	Minor construction sites, with limited use of haul roads	25M	10M	10M

5.2.2 CLIMATE LEGISLATION AND GUIDANCE

Climate Agreement

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 and formally in May 2002 (Framework Convention on climate Change – 1999 and Framework Convention on Climate Change – 1997). For the purpose of the European Union, burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012.

The UNFCCC is continuing detailed negotiations in relation to GHGs reduction and in relation to technical issues such as emissions trading and burden sharing. The most recent Conference of the Parties (COP19) Workshop was held in Warsaw, Poland in November 2013, with mandated events held every year since.

The EU has also published the *'20-20-20 Climate and Energy Package'*. The 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. It calls for a 20% reduction in greenhouse gas emissions, a 20% share of renewable energy and 20% energy efficiency improvements by 2020.

Gothenburg Protocol

Ireland signed the Gothenburg Protocol to the 1979 UN convention on Long Range Transboundary Air Pollution in 1999. The objective of the protocol is to control and reduce emission of Sulphur Dioxide (SO2), Nitrogen Oxide (NOx), Volatile Organic Compounds (VOCs) and Ammonia (NH3). To achieve the targets Ireland, by 2020, had to meet national emission ceilings of 42kt for SO2 (67% below 2001 levels), 65kt of NOx (52% reduction), 55kt for VOC (37% reduction) and 116kt NH3 (6% reduction).

European Commission Directive 2001/81/EC, the National Emission Ceiling Directive, prescribes the same emission limits. Emissions of SO2 and NH3 from the road traffic sector are insignificant accounting for less than 1.5% of total emissions in Ireland in 2001. Road traffic emissions of nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs) are important accounting for 37% and 38% respectively of total emissions of these pollutants in Ireland in 2001.

A national programme for the progressive reduction of emissions of the four transboundary pollutants is in place since April 2005. A review of the National Programme in 2011 showed that Ireland complied with the Emission ceiling for SO2, VOCs and NH3, but failed to comply with emissions ceiling for NOx. Although emissions from road traffic decreased by 47% over the period 1990-2011, NOx levels in 2011 were 2.5kt above the ceiling of 65kt.

Ireland is among six member states to have persistently exceeded their emission ceilings for NOx between 2010 and 2015 based on the latest air pollutant emissions inventory data reported by Member States in February 2017. Ireland also had the highest exceedance for non-methane volatile organic compounds (NMVOCs) in 2015, 84% above the ceiling level. According to the report, this is due to the recent addition of NMVOC emissions from agriculture into Ireland's emission inventory.

According to an April 2017 report from the Environmental Protection Agency (EPA), the brunt of Ireland's emissions come from the agricultural and transport sectors. Combined, they are projected to account for three-quarters of Ireland's total non-ETS emissions in 2020.

The EPA recently found that Ireland would fail to meet its upcoming emissions targets if the state continues to rely on current climate policies. The EPA report projected that emissions will only be reduced by 4 - 6% below 2005 levels, well below the 20% target.

5.3 METHODOLOGY

This assessment has been prepared in accordance with and regard to the following documents:

- Environmental Protection Agency guidelines on the *Information to be Contained in Environmental Impact Statement* (EPA 2002, Revised 2015 & 2017);
- Environmental Protection Agency Advice Notes on Current Practice (*in the preparation of environmental Impact Statement*)(EPA 2003);
- Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA 2006, revised 2011);
- EPA (2006) Environmental Management in the Extractive Industry.
- GSI (2008) Geological Heritage Guidelines for the Extractive Industry..

A desk study was undertaken to identify activates associated with the proposed development that could generate emissions to atmosphere, and the key pollutants associated with these emissions. The construction and operational activities were examined to identify those activities that have the potential to impact negatively on the local air quality.

Air quality depositional dust monitoring records carried out in compliance with the sites planning conditions were also reviewed. An additional baseline depositional dust monitoring survey was also undertaken as part of this assessment.

The desk-based assessment carried out involved:

- Initial scoping of possible emission sources and key pollutants through review of the project's construction and operational activities;
- Review of relevant assessment criteria, guidelines and best practice to assess the potential impact of the proposed development on air quality (at sensitive receptors) and climate;
- Review of the existing EPA air monitoring data to determine baseline air quality:
- Review of the Cork County Development Plan;
- Review of the 20-year average meteorological data at the nearest synoptic weather station;
- Review of Irelands Provisional Greenhouse Gas Emissions;
- Review of Irelands National Climate Change Strategy.

5.4 DESCRIPTION OF BASELINE ENVIRONMENT

5.4.1 SITE LOCATION

The location of the proposed development is in the townland of *Carrigdownane Upper*, Co. Cork.

The site is a rural, farming area predominantly comprised of farmsteads, farm hubs, pastureland and hedgerows / treelines. The area is rural in character with residences in the area predominantly linearly aligned along the existing road network.

The current permitted extraction area is approximately 2.923 ha, including berms. The proposed development is a 10 year planning permission for the continuation of an existing quarry operation, a 4.21 hectare extension of the boundary and all ancillary site works.

The proposed development would be a continuation of the current quarrying operation. This would include blasting, crushing, screening, stockpiling and transport of limestone. The operation also includes the production of agricultural limestone.

5.4.2 EXISTING AIR QUALITY

According to the EPA Air Quality Index for public health, the townland of *Carrigdownane Upper* is located in the Rural-West Air Quality Index for Health (AQIH) Region, which is classed as 3 – Good (last update: 25th May 2021). This is within the highest category for air quality. The index is based on information from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution.

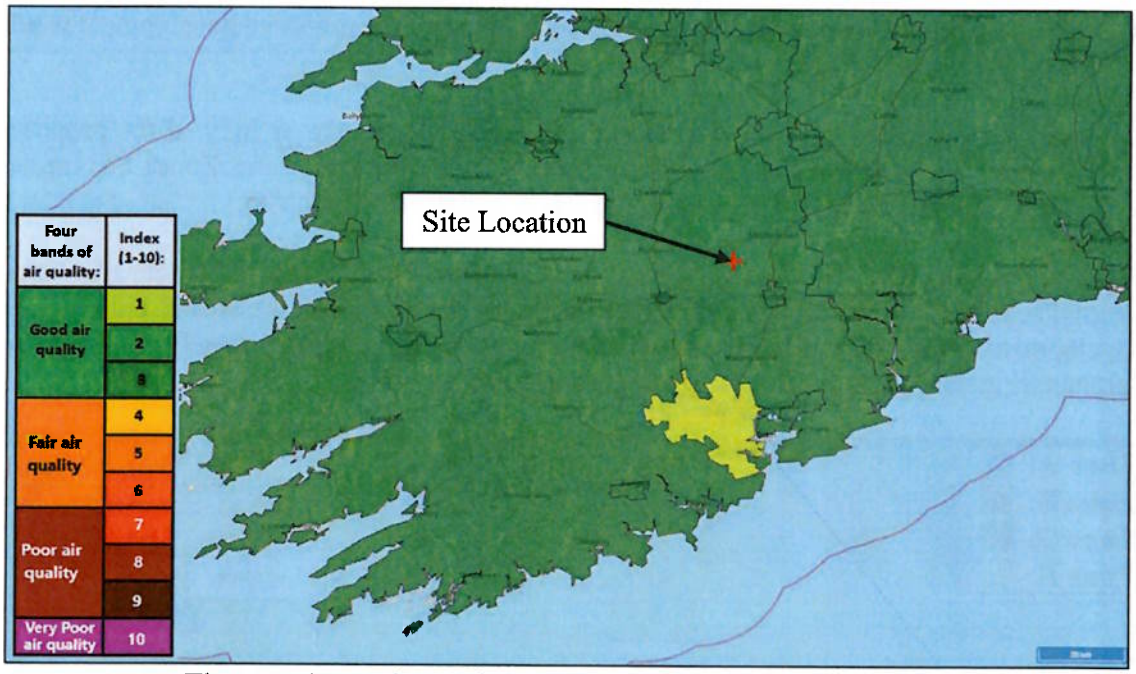

Figure 5.1: Air Quality Index for Health Map (EPA Maps)

The dominant existing sources of air pollution in the area would be local road traffic, private residences and emissions from agricultural activities, such as housing of animals and spreading of organic fertilisers. However, the combined effect on air quality would be expected to be low. Dust would also be generated on local roads and from agricultural activities, particularly during dry periods.

Air quality is judged relative to the Air Quality Standards, which are concentrations of pollutants in the atmosphere, which achieve a certain standard of environmental quality. Air Quality Standards are formulated on the basis of an assessment of the effects of the pollutant on public health and ecosystems.

The EPA has been monitoring national air quality from a number of sites around the country. This information is available from the EPA's website.

Under the '*Clean Air for Europe Directive*', EU member states must designate '*Zones*' for the purpose of managing air quality. For Ireland, four zones were defined in the '*Air Quality Standards Regulations* (2011)'. The zones were amended on 1st January 2013 to take account of population counts from the 2011 CSO Census, and to align with the coal restricted areas in the 2012 Regulations (S.I. No. 326 of 2012).

The main areas defined in each zone are:

- **Zone A:** Dublin,
- Zone B: Cork,
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise,
- **Zone D:** Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

According to the EPA's classification of zones for air quality, the proposed development would be located in Zone D – Rural.

There are no air monitoring stations currently operating within the vicinity of the proposed development. The nearest monitoring station located within the same zone, Zone D, is located at Castlebar, approximately 33.33km from the proposed development site.

While this station is located a considerable distance from the proposed development site, it may be used to provide an indicative baseline assessment of air quality for the area of the proposed development. Data from Claremorris was not utilised as a limited number of relevant parameters are monitored at this station (particulate matter only).

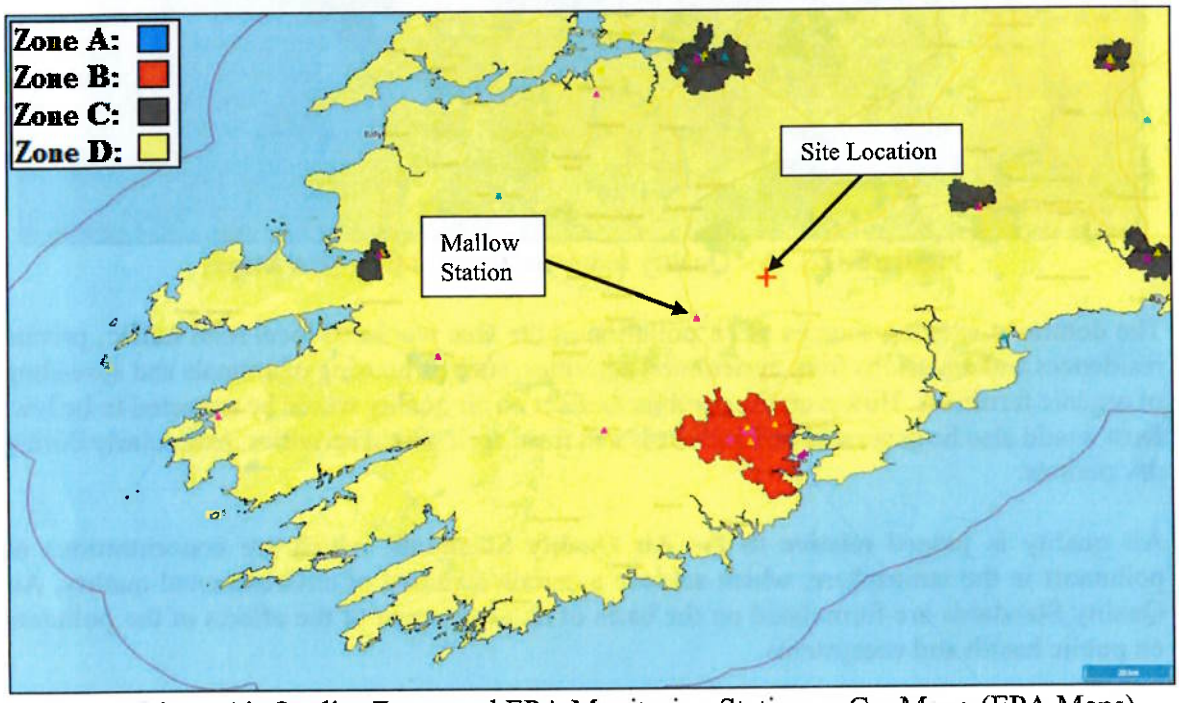

Figure 5.2: Air Quality Zones and EPA Monitoring Stations – Co. Mayo (EPA Maps)

The air quality station in Mallow was commissioned in December 2020 and is located in a parking area on Bridge Street (156183 E, 098171 N). Nitrogen dioxide, ozone, and particulate matter (PM10 and PM2.5) are measured at this site. Recent results can be found at https://airquality.ie/station/EPA-82, and was accessed on 20th March 2023.

Table 5.9 below summarises the annual mean results for monitoring during 2021 and 2022 for the nearest monitoring station (Mallow) to the proposed development. All results returned were below the relevant annual mean limit values.

Table 5.9: Annual Mean for Air Monitoring undertaken at Mallow Monitoring Station

Parameter (µg/m³)	Annual Mean Limit	Mallow Station	
		2021	2022
NO_2	40	16.0	15.9
O_3	-	47.0	53.5
PM_{10}	40	14.7	13.5
$PM_{2.5}$	20	7.6	7.5

Live Monitoring

In addition to the above published data the Mallow monitoring station also publishes live date for Ozone, Nitrogen Dioxide and PM10.

This data is available at https://airquality.ie/. The latest measurements, viewed on 20th March 2023, were:

- PM_{10} – 4.75 µg m^{-3} (24-hour mean).
- $PM_{2.5}$ – 3.64 µg m^{-3} (24-hour mean).
- Ozone – 53.71 µg m^{-3} (8-hour mean).
- Nitrogen Dioxide – 18.22 µg m^{-3} (1-hour mean).

These figures gave an Air Quality Index of 2 (Good).

5.4.3 DEPOSITIONAL DUST

Dust monitoring is required to be carried out quarterly by Rockmills Quarry as per the requirements of planning permission 15/5484.

Figure 5.3: Depositional Dust Monitoring Locations

Prior to 2022, depositional dust monitoring was carried out at locations adjacent to the existing quarry boundary (D1o and D2o). These monitoring locations were revised to the new locations (D1n and D2n). An additional dust monitoring location was included for the EIA baseline depositional dust monitoring survey.

A limit of 350 mg/m2 at the site boundary over a 30 day monitoring period is in place for the site, in accordance with the guidance document EPA (2006) Environmental Management in the Extractive Industry and German TA Luft Air Quality Standard (Bergeroff).

The following table details the monthly dust monitoring at the site between September 2020 and May 2022, as carried out by BHP laboratories. These results are included in **Attachment 5.1.1**. The table also included the results of EIA baseline depositional dust monitoring carried out between Thursday 12th May 2022 and Wednesday 15th June 2022. The test datasheet is included in **Attachment 5.1.2**.

Table 5.10: Depositional Dust Monitoring Dataset

Sample Date	D1	D2	D3
15/5484 Limit	**350**	**350**	**350**
16/09/2020	103	102	
14/10/2020	103	139	
11/11/2020	154	293	
09/12/2020	30	103	
13/01/2021	**933**	133	
10/02/2021	108	126	
10/03/2021	159	**396**	
07/04/2021	6	34	
05/05/2021	44	41	
11/06/2021	**413**	**596**	
09/07/2021	9	14	
11/08/2021	6	31	
02/09/2021	**471**	94	
06/10/2021	81	112	
10/11/2021	13	16	
08/12/2021	**713**	82	
05/01/2022	**407**	**408**	
02/02/2022	276	**365**	
02/03/2022	84	181	
04/04/2022	117	109	
04/05/2022	119	137	
15/06/2022	82	91	59
07/09/2022	116	134	
02/11/2022	247	117	
04/01/2023	270	350	
01/03/2023	76	111	
05/04/2023	80	82	80
Average	**193**	**163**	**70**
% Compliance	**81.48%**	**85.19%**	**100%**

Several exceedances have occurred over the assay period. A previous assessment submitted to Cork County Council (Environmental Audit for an existing quarry at Carrigdownane Upper, Rockmills, Kildorrey, Co Cork, DixonBrosnan,2021) noted that dust arising from the adjacent farm track may be contributing to occasional elevated dust levels, particularly during heavy agricultural traffic periods (spring fertilizing, summer/autumn silage cutting etc.) and

recommended a revision of the agreed monitoring locations. The monitoring locations were revised in 2022, as shown in **Figure 5.3**.

PES would note that several exceedances occur during the winter period, when weather conditions would tend to reduce depositional dust levels, in particular the winter of 2021-2022. It is considered that these exceedances are likely due to inappropriate new sampling locations and equipment. It is recommended that sampling points are located away from treelines and hedgerows to avoid vegetation detritus and enhanced dust deposition in these regions. It is also recommended that the Bergeroff Stands are designed to prevent the perching of birds on the sampling equipment.

It is noted that several additional dust mitigation measures have been implemented at the site since 2021, as detailed in **section 2.3.2.2** "Existing Mitigation Infrastructure" of this EIAR. It is anticipated that all depositional dust levels from the site will be reduced as a result of these measures.

5.4.4 EXISTING CLIMATE

Ireland has a temperate oceanic climate according to the Koppen-Geiger Climate Classification System. This means, like most of North-West Europe it is mild, moist and changeable, with abundant rainfall and a lack of temperature extremes. Due to its proximity to the Atlantic Ocean, Ireland has mild damp summers and cool wet winters and does not experience the temperature extremes of other countries at similar latitudes.

Ireland's weather patterns are characterised by the frequent passage of Atlantic low pressure weather systems and associated frontal rain belts from the South-West. These moisture-laden fronts break on the mountainous west coast, resulting in the highest rainfall levels in the west. Valentia Island of Kerry receives twice the level of rainfall to Dublin (1,684mm vs 884mm). In summer months, the influence of anti-cyclonic weather conditions results in drier continental air, in particular when winds are from an easterly direction are interspersed by the continuing passage of Atlantic frontal systems.

Occasionally, the establishment of a high pressure area over Ireland and the UK results in calm, dry conditions. In the winter, these periods are characterised by the formation of low-level temperature inversions at night-time. Fog can occur in low-lying areas in the region under these conditions of slack winds and clear skies.

If anti-cyclonic conditions become established for a few days or more during the summer months, high daytime temperatures may be recorded, especially in Midland areas away from cooler coastal areas. Prolonged dry weather conditions are relatively infrequent but, should easterly continental airflows persist, drought conditions may result in the region, which may last for up to 2 to 3 weeks.

The potential effects of climate change on a global scale have been investigated by the Intergovernmental Panel on Climate Change (IPCC). The resulting impacts in Ireland are outlined in the National Climate Change Strategy 2007-2012 (Department of Environment Heritage and Local Government, 2007) and by the EPA's Climate Change Research Programme.

The potential impacts include the following:

- Significant increases in winter rainfall, of the order of 10% in the southeast, with a corresponding increase in the water levels in rivers, lakes and soils.
- Lower summer rainfall, of the order of 10% in the southern half of the country. Less recharge of reservoirs in the summer.
- An overall annual increase in rainfall in the north and west. An overall decrease in rainfall in the east of the country and a resultant decrease in baseline river-flows.
- An overall mean temperature increase (0.7° between 1890 and 2008). This trend is set to continue and possibly accelerate.
- An increase in extreme weather events: serious flooding more frequent than at present – particularly in the southeast. More regular and prolonged droughts and associated water shortages, particularly in the southern half of the country.

Further adverse climate change impacts are projected to affect Ireland in the coming decades and during the rest of this century. Uncertainties remain in relation to the scale and extent of these impacts, particularly during the second half of the century. The greatest uncertainly lies in how effective global actions will be in reducing greenhouse gas emissions. Predicted adverse impacts include:

- Sea level rise;
- Further increase in intense storms and rainfall events;
- Water shortages in the summer in the east;
- Adverse impacts on water quality;
- Changes in distribution of plant and animal species;
- Adverse effects on fisheries.

The nearest Met Éireann meteorological station providing hourly data is located at:

- Moore Park, Fermoy, Co. Cork (181900 E, 101400 N, 46m above mean sea level).

The station was opened in 2003, however, data from this station will be used to estimate the 20-year monthly averages for rainfall, mean temperature, and mean wind speed. These measurements would be generally representative of prevailing conditions experienced in the vicinity of proposed development in *Carrigdownane Upper*, Co. Cork.

The 2022 total monthly rainfall, mean temperature and mean wind speed from the Moore Park weather station have been compared to the 20-year averages (2003 to 2022) for each month to determine the degree of representation of the actual meteorological conditions versus what is experienced on average at the site. This comparison is presented in **Table 5.11**.

Table 5.11: 2022 and 20-year average meteorological conditions from Moore Park Station

Month	Rainfall		Temperature		Wind Speed	
	2022 (mm)	Average (mm)	Mean 2022 (°C)	Average (°C)	Mean 2022 (knots)	Mean Average (knots)
Jan	43.5	105.2	6.0	5.6	4.7	6.2
Feb	96.9	85.6	7.4	5.7	8.6	6.7
Mar	83.1	78.0	6.7	6.6	6.2	6.5
Apr	69.3	64.4	9.1	8.7	6.3	6.2
May	43.6	67.3	12.3	11.4	5.9	6.1
Jun	73.4	73.9	13.8	14.2	5.7	5.7
Jul	33.5	74.3	16.6	15.8	5.3	5.4
Aug	27.6	84.4	16.8	15.2	4.4	5.5
Sep	139.9	81.9	13.7	13.4	5.3	5.2
Oct	230.4	114.3	12.2	10.7	6.5	5.6
Nov	167.8	108.5	9.0	7.6	6.6	5.8
Dec	90.1	113.1	4.3	6.1	5.3	6.2
Annual	**91.6**	**87.6**	**10.7**	**10.1**	**5.9**	**5.9**

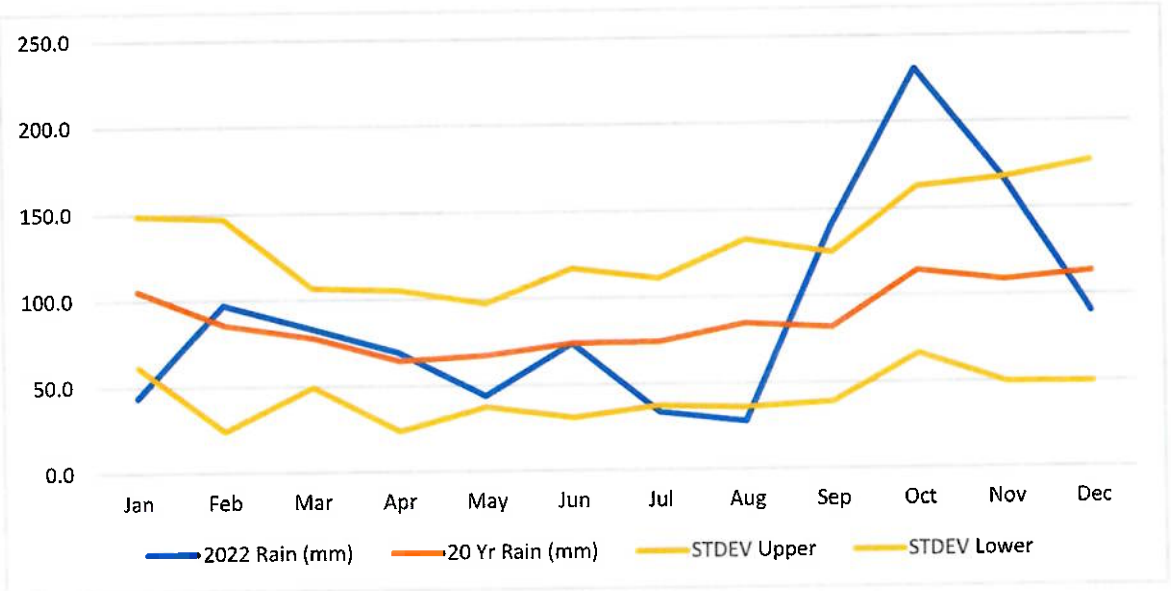

Figure 5.4: Moore Park 2022 Rainfall Vs 20 Year Average

Overall, rainfall during 2022 was 4.0mm more than the corresponding 20-year averages. September to November had higher rainfall than the 20-year average, while July and August were drier.

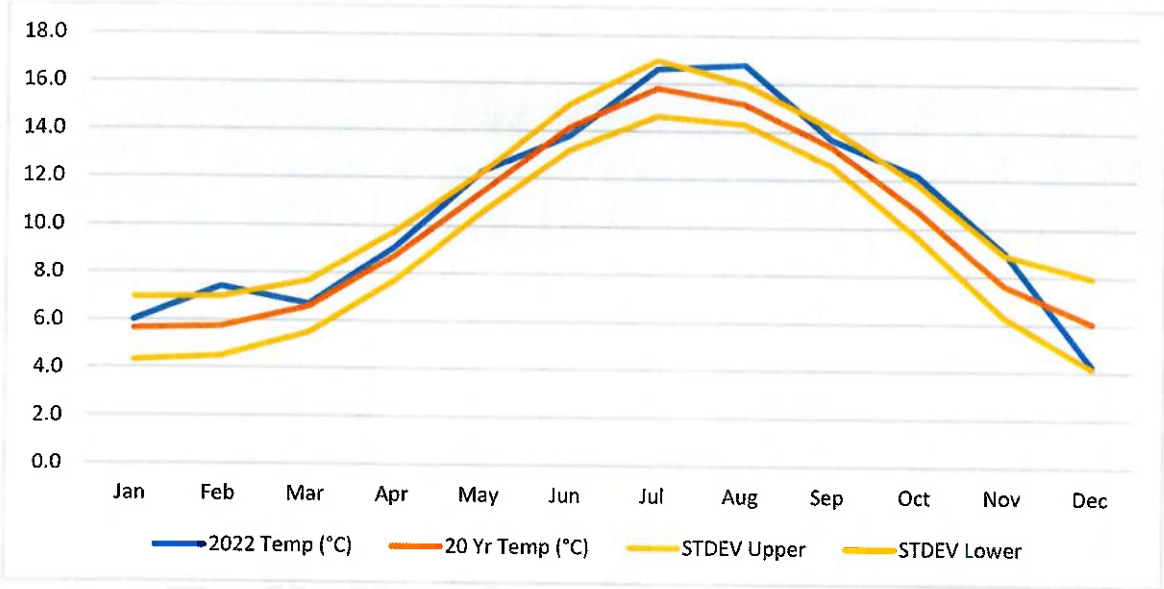

Figure 5.5: Moore Park 2022 Temperature Vs 20 Year Average

The overall mean temperature for 2022 was 0.6°C higher than the corresponding 20-year average. June and December was colder than the 20-year average, while July and August were warmer than the 20-year average.

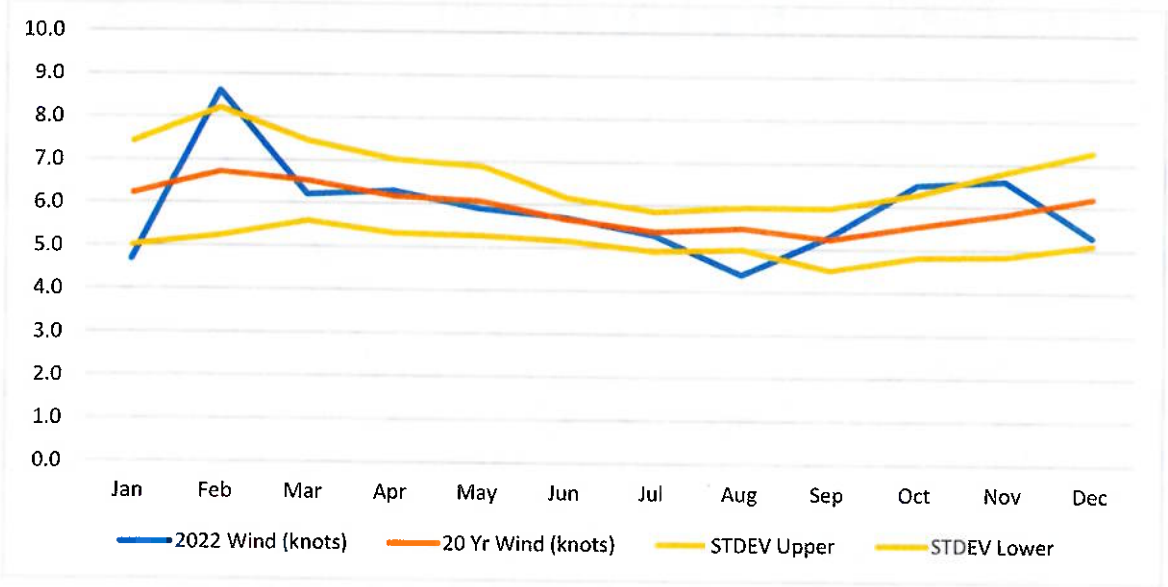

Figure 5.6: Moore Park 2022 wind Speed Vs 20 Year Average

The average wind speed recorded during 2022 was 0.02 knots lower than the 20-year average. February had higher average wind speeds than the 20-year average, while August had lower average wind speeds than the 20-year average.

5.5 IMPACTS

5.5.1 CONSTRUCTION & REHABILITATION PHASES

During the Construction Phase a green field will be prepared for extraction activities. Works will include the removal of soils and topsoil, removal of vegetation at the boundary within the existing quarry, the creation of soil embankments / berms along the site (other) boundaries, the planting of established soil embankments and supplementary planting of existing hedgerows.

During the Rehabilitation Phase of the proposed development, the area designated as 3R within the quarry extraction area would be restored to promote the development of mixed habitats through natural regeneration. Areas of restored soil cover (minimum 1m depth) and rock rubble would be created and sectioned off from the operating quarry area. The area designated as 6R would be retained as bare stone habitat. If material is available onsite (i.e. excess waste stone or soil) the maximum area possible would be restored with a minimum 1m of soil with sloped stone rubble verges. Therefore, 3R mixed habitats would extend into the 6R area along the northern boundary, in so far as available materials allow.

These activities generate particulate materials, including dust and PM_{10}. The movement of machinery, construction vehicles and the use of plant equipment during the construction phase would also generate emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Particulate Matter (PM) and Carbon Monoxide (CO).

The following sections describes the potential impacts on local air quality and nearby sensitive receptors resulting from work associated with the construction phase of the proposed development.

5.5.1.1 Air Quality

The operation of machinery during the construction phase will generate exhaust fumes containing predominantly SO_2, NO_x, CO_2 and particulate matter (PM10). The impact of emissions from plant and machinery during the construction and rehabilitation phases would be local, relatively minor and temporary in nature.

Overall, the impact on local air quality from vehicles during the construction and rehabilitation phases would be temporary and slight with no significant impact.

5.5.1.2 Dust Emissions

During the construction and rehabilitation phases, there will be a higher potential for the generation of airborne dust during the exposure and movement of overburden soils, the construction of boundary earth berms and the movement of soil stockpiles for the implementation of the restoration plan.

The works would occur on a phased basis over the 10-year lifetime of the proposed planning permission. The removal of overburden would occur in sections as the extraction area expands through the proposed western quarry extension.. The initial overburden removal activities would be used to establish earth berms at the boundaries of the proposed extraction area. Excess overburden would be deposited with the existing stockpile within the quarry floor.

These activities such as excavation, earth moving and backfilling would generate a short-term increase in the risk of airborne dust. The severity of dust generation would be primarily dependent upon the nature of the overburden, weather conditions and mitigation measures implemented.

Large particles (100µm diameter) are likely to settle within 5-10m of their source under a typical mean wind speed of 4-5 m/s, and particles between 30-100 µm diameter are likely to settle within 100m of the source.

These impact distances are also outlined within NRA effect significance criteria outlined in **Table 5.8**. For large construction sites, this table outlines distances of 25m for significant impacts on vegetation and PM_{10}, and 100m for soiling.

It is noted that, the closest sensitive residential receptor is located approximately 400m from the existing and proposed site boundary. In the prevailing north-eastern downwind direction, sensitive residential receptors are in excess of 500m from the existing and proposed site boundary.

In order to ensure that potential dust emission are appropriately managed to ensure minimisation of impacts, dust mitigation measures are provided in **Section 5.6**.

Due to the set-back distances from the proposed development and assuming the implementation of appropriate mitigation measures, there would be no significant dust impacts during the construction phase at the nearest receptors.

5.5.2 OPERATIONAL PHASE

5.5.2.1 Air Quality

The use of machinery, vehicles and the use of the generator will generate exhaust fumes containing predominantly SO_2, NO_x, CO_2 and particulate matter (PM10). The proposed development would be a continuation of the current quarrying activity. Adherence to *good site & engineering practice* will minimise the generation of any unnecessary air emissions.

The emission levels would be considered to be minor in the regional context and unlikely to significantly influence air quality.

5.5.2.2 Dust Emissions

As stated above, the proposed development would be a continuation of the current quarrying activity. Therefore, it is anticipated that the current depositional impacts would be maintained during the operation of the proposed development.

As per **section 5.5.2.2** on construction dust impacts above, the set back distances from sensitive residential receptors would make significant dust impacts at these locations very unlikely.

As detailed in **section 5.4.3**, there have been several exceedances of the planning permission 15/5484. However, it is considered likely that these exceedances may be due to inappropriate sampling locations leading to non-site related dust skewing the results.

It is also noted that several additional dust mitigation measures, as detailed in **section 2.3.2.2**, have been implemented at the site in 2021 and 2022. It is considered that these mitigation measures are appropriate for the effective prevention of significant dust emissions from the site. The preparation of a consolidated Environmental Management Plan for the site would aid in the ongoing maintenance of environmental and housekeeping standards.

Therefore, it is considered that there would be no significant dust impacts during the operational phase at the nearest receptors.

5.5.3 CLIMATE IMPACTS

Greenhouse gas emissions from the construction and rehabilitation phases of the development would be comprised of front loaders and an excavator.

The proposed development would be a continuation of the current quarrying activity. This would be comprised of the operation of a tracked excavator, front loaders, mobile crushing machine, mobile screening machine, diesel generator and transportation lorries.

Due to the size and nature of the proposed development, greenhouse gas emissions resulting from the development would be insignificant in terms of national CO_2 emissions and the national agreed limits under the Kyoto Protocol. Thus, the impact of the proposed development on climate would be unnoticeable.

5.5.4 CUMULATIVE IMPACT

The closest currently operating quarry to the proposed quarry extension is Lagans Cement, approximately 4.5km East. It is not considered that there would be any significant cumulative air quality impacts between these sites at this distance.

There are no know proposed new quarries within the vicinity of the proposed quarry extension.

It is noted that this proposal is for the continuation and extension of an existing quarry. Therefore, the proposed development would result in this quarry activity continuing to contribute to the existing air environment over the proposed 10 year planning permission.

5.5.5 'DO NOTHING' IMPACT

Should the proposed development not be permitted, the current 10 year planning permission (15/5484) would lapse in 2025. Onsite operations, including air emission characteristics, would continue within this time frame until the available stone resource is exhausted.

Following this period, the quarrying operation would cease with no further air emissions from the quarry site.

5.6 MITIGATION MEASURES

It is considered that the proposed development will not result in any significant adverse impacts to air quality or climate. The primary potential nuisance associated with activities is dust.

Outlined below is a series of mitigation measures and good working practices to ensure that the risk of nuisance dust is minimised, and to ensure there will be no adverse impacts on the receiving environment.

5.6.1 CONSTRUCTION & REHABILITATION PHASE

5.6.1.1 Construction & Rehabilitation Phase Generation of Dust

The following control measures for dust and fine particulate emissions (PM10) should be implemented:

- Mitigation measures and working practices which would occur over the course of the 10-year permission should be included within an Environmental Management Plan for the site.
- As the phasing of soil removal would be over an extended period, this would allow for the selection of good weather conditions for the prevention of dust. Overburden removal should not be carried out dry and/or windy weather conditions. Soils condition should be moist but friable at the time of earthworks to minimise available material for the generation of dust.
- Boundary earth berms should be seeded with grass as soon as possible (assuming appropriate planting season).
- Boundary earth berms should be planted with appropriate hedgerow species as soon as is possible, implementing the planting plan which has been used for existing earth berms (i.e. a double line of hawthorn whips has been planted at 1m spacing).
- Supplemental planting should be implemented on any gaps in existing boundary hedgerows.
- If practical, implement grass seeding on overburden stockpiles,
- During the rehabilitation phase, wetting should be implemented during dry conditions on restored rubble / soil areas until recolonising species become established.

5.6.1.2 Construction Air Emissions

Mitigation measures to minimise related vehicle emissions include:

- Ensure regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they perform most efficiently.
- All vehicles and machinery will be switched off when not in use (i.e. no idling).

5.6.2 OPERATIONAL PHASE

Mitigation to ensure significant quantities of air pollutants are not generated during the operational phase has been incorporated into the design proposal.

- Draft and implement an Environmental Management Plan for the site, including those in **section 2.3.2.2**, to aid in the ongoing maintenance of environmental and housekeeping standards.
- The EMP should also include additional mitigation measures such as:
    - Vehicle speeds should be controlled within the development area to prevent high levels of dust being re-suspended from the construction area.
    - Public roads entering and exiting active construction areas should be inspected daily and swept as necessary.
    - If road dust levels are significant, a road sweeping vehicle should be used.

5.6.2.1 Air Quality

It is considered that the operational phase of the development will not have a significant negative impact on the local air quality.

- Ensure regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they perform most efficiently.
- All vehicles and machinery will be switched off when not in use (i.e. no idling).

5.6.3 CLIMATE MITIGATION

The impact of the proposed development on climate will be negligible, therefore no site specific mitigation measures are required.

5.7 DIFFICULTIES ENCOUNTERED

No difficulties were encountered during the assessment.

5.8 REFERENCES

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6.0 NOISE ENVIRONMENT

6.1 INTRODUCTION

Denis O' Keeffe is applying for permission to continue operation and extend the existing limestone quarry at Carrigdownane Upper, Rockmills, Co. Cork.

This study identifies, describes and assesses the potential impacts of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (noise sensitive receptors).

6.2 LEGISLATIVE CONTEXT

Planning and Development Act 2000 (S.I. No. 30 of 2000), as amended

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanála attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

The EPA Act (Noise) Regulations 1994 (S.I. No. 179 of 1994)

The relevant part of the Environmental Protection Agency Act 1992 dealing with noise is Part VI, Sections 106 to 108. These sections deal with the control of noise, the power of local authorities to prevent or limit noise and the issue of noise as a nuisance.

The 1994 Regulations came into effect in July 1994 and outline the procedures for dealing with noise nuisance. The Regulations allow affected individuals, local authorities or the EPA to take action against an activity causing a noise nuisance.

These Regulations replaced the procedures for noise complaints contained in the Local Government (Planning & Development) Act 1963. Companies must show that reasonable care was taken to prevent or limit the noise from their activities. If the courts decide that a company is responsible for causing a noise nuisance, they can order the company to take measures to reduce, prevent or limit it.

EPA 'Guidance Note on Noise (NG4)' (2016)

The document relates primarily to noise surveys and assessments for EPA licensed facilities but in the absence of any other directly applicable guidance documents, it also is pertinent for the purposes of noise surveys and assessments accompanying planning applications.

It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the settling of noise Emission Limit Values (ELVs) and compliance monitoring. In relation to production facilities and ancillary activities, it is recommended that noise from the activities on-site shall not exceed the following noise ELV's at the nearest noise-sensitive receptor:

Table 6.1: EPA Recommended Noise Limits

Period	Times	Standard dB(A)	Low Background Noise Area dB(A)
Day	07:00 -19:00hrs	55dB $L_{Ar,T}$	45dB $L_{Ar,T}$
Evening	19:00 - 23:00hrs	50dB $L_{Ar,T}$	40dB $L_{Ar,T}$
Night	23:00 - 07:00hrs	45dB $L_{Aeq,T}$	35dB $L_{Aeq,T}$

Other EPA general EIA guidelines such as Guidelines on the Information to be Contained in Environmental Impact Statements [2002] and Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) [2003] have been considered in the preparation of this Noise and Vibration Chapter.

Conditions of Previous Planning Applications 15/5484 and 21/5792

An environmental noise monitoring programme is in place of the assessment of noise amenity at noise sensitive receptors in the vicinity of the quarry activity. Noise monitoring is carried out in the vicinity of N1 (E 171911, N 107306), N2 (E 172327, N 107632) and N3 (E 172601, N 106753). Noise monitoring is carried out quarterly.

The following table summarises the current noise conditions under current planning permissions.

Table 6.2: Environmental Noise Limits for Rockmills Quarries (Pl Ref 15/5484):

Noise Limit (monitoring duration)	Applicable period
L_{Aeq} 55dBA (30 minutes)	Quarry operating hours (07:30hrs – 18:00hrs Mon-Fri 07:30hrs-16:00hrs Saturday)
L_{Aeq} 45 dBA (15 minutes)	Any other time

Each blasting event is required to be monitored at the boundary of the quarry. Blasting operations are limited to within the hours of 09:00 hrs to 18:00 hrs Monday to Friday, excluding public holidays, bank holidays and weekends. The frequency of blasting may not exceed 1 blast per month.

An air pressure limit of 125dB is applied to blasting activities at the site. A peak particle velocity (PPV) limit of 12 mm/s is in place for vibration at the nearest premises.

The National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)

The NRA's guidance document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) is the recognised Irish guidance document for the assessment of road traffic noise. This document sets out the key items that should be included in a noise and vibration assessment for any significant road scheme. As a minimum, it stipulates that the following items should be included:

- A series of noise surveys to quantify the prevailing noise climate at sensitive receptors along the existing and proposed routes
- Preparation and calibration of a suitable noise prediction model;
- Prediction of Do Minimum and Do Something noise levels for opening and design years;
- Comparison of predicted Do Something noise levels with the design goal and three conditions that must be satisfied before mitigation measures are deemed necessary;
- Specification and assessment of road traffic mitigation measures, where required;
- Assessment and review of construction impacts and mitigation measures;
- Assessment and review of vibration.

This document has been referred to in the consideration of road traffic noise associated with the proposed development. The document also presents maximum permissible noise levels at dwelling facades during construction activities. This provide a useful reference for assessing construction noise of the proposed development.

Table 6.3: The National Roads Authority (NRA) Guideline Construction Noise Limits

Days / Times	$L_{Aeq\ (1hr)}$ dB	$L_{pA\ (max)slow}$ dB
Monday to Friday (07:00 – 19:00hrs)	70	80
Monday to Friday (19:00 – 22:00hrs)	60	65
Saturday (08:00 – 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 – 16:30hrs)	60	65

6.3 REGIONAL NOISE ENVIRONMENT SETTING

The site is located in a predominantly rural, farming area comprised of farmsteads, farm hubs, pastureland and hedgerows / treelines. Residences in the area predominantly linearly aligned along the existing road network.

The Crossmore Tyre Recycling Ireland is located adjacent to the proposed development and is under the ownership of the extended family of the applicant. Monaghans Transport company is located on the southern edge of Kildorrerry, approximately 3.25km north west. Lagan Cement, Nutgrove, Glanworth is located approximately 4.5 km east of the proposed development.

The proposed development is accessed from the L5612 local road (c.415m set-back from the road). The regional R512 Kildorry-Glanworth road is located approximately 1km to the north of the site. The national N73 Motchelstown-Mallow road is located approximately 4km to the north of the site and the M8 Cork-Portlaois motorway is located approximately 8.25km east of the site.

The site is located approximately 1 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively.

6.4 EXISTING NOISE CLIMATE

There are no significant dominant point noise sources in the region as the local area is rural and not influenced by significant local industry. While the proposed development is in a rural area, the influence of traffic from the local roads during the daytime is a dominant noise source in the area.

The only significant noise activities in the immediate area are the Rockmills Quarry operation and the adjacent Crossmore Tyre Recycling Ireland operation.

Additional occasional noise for the area would occur from the operation of agricultural vehicles on local roads and surrounding farmlands. This noise source would be particularly notable during spring and autumn.

6.4.1 QUIET AREA SCREENING

The location of the development has been screened in order to determine if it is located in an area that could be considered a 'Quiet Area' according to the EPA NG4 Guidance, which states:

The location of the proposed development should be screened in order to determine if it is to be located in or near an area that could be considered a 'Quiet Area' in open country according to the Agency publication Environmental Quality Objectives - Noise in Quiet Areas.

This is achieved using the following checklist:

Table 6.4: Quiet Area Screening Checklist

Screening Question	Answer	
	Yes	No
Is the site >3km away from urban areas with a population >1,000 people?	✓	
Is the site >10km away from urban areas with a population >5,000 people?	✓	
Is the site >15km away from urban areas with a population >10,000 people?	✓	
Is the site >3km away from any local industry?		✓
Is the site >10km away from any major industry centre?	✓	
Is the site >5km away from any national primary route?		✓
Is the site >7.5km away from any motorway or dual carriageway?	✓	
QUIET AREA?		✓
Other Relevant Comments	Rockmills (pop: <1,000) – 1 km NW. Kildorrery (pop: 357) – 4km NW. Glanworth (pop: 603) – 4km SE. Mitchelstown (pop: 3,740) – 12km NE. Fermoy (pop: 6,585) – 12km SE. Crossmore Tyre Recycling – 0 km S Monaghans Transport – 3.25km NW Lagans Cement – 4.5km E N73 primary route – 4km N. M8 primary route – 8.25 km E.	

The proposed development location does not include all criteria, as per the above checklist. Therefore, it is considered that the development would not be located within a '*Quiet Area*'.

6.4.2 AREAS OF LOW BACKGROUND NOISE SCREENING

When an area is not identified as being *a 'Quiet Area'*, the existing background noise levels measured during the environmental noise survey should be examined to determine if they satisfy the following criteria:

- Average Daytime Background Noise Level ≤ 40dB LAF_{90}
- Average Evening Background Noise Level ≤ 35dB LAF_{90}
- Average Night-time Background Noise Level ≤ 30dB LAF_{90}

The following noise levels are averages based upon noise monitoring carried out in the vicinity of Rockmills Limestone Quarry.

Daytime noise averages include planning condition quarterly daytime noise monitoring results obtained between 2021 and 2022. Daytime noise results from baseline monitoring carried out on Thursday 12th May 2022 as part of this EIAR are also included. Evening and night time results were recorded on Thursday 12th May 2022 and Friday 13th May 2022 as part of this EIAR. Monitoring results are included in **section 6.6**.

Background LAF_{90} noise levels at the monitoring locations are generally influenced by traffic on local and surrounding roads, agricultural activities offsite and other offsite sources.

Table 6.5: Average Baseline Noise Monitoring Results

Ref	Location	Daytime		Evening		Night-time	
		LAeq, T	LAF_{90}	LAeq, T	LAF_{90}	LAeq,T	LAF_{90}
N1	Noise Sensitive Receptor c.555m North of site boundary	49	41	45	36	29	22
N2	Noise Sensitive Receptor c.975m North-East of site boundary	47	36	-	-	-	-
N3	Noise Sensitive Receptor c.400m East of site boundary.	41	35	42	34	29	23
N4	Noise Sensitive Receptor c.675m South-East of proposed site boundary	53	43	48	31	33	24
N5	Noise Point c.740m South-West of proposed site boundary	43	37	34	25	23	20
Average		**46**	**38**	**42**	**32**	**29**	**22**

Average noise levels at N1 and N4 daytime and N1 evening-time do not fall below "Low Background Noise Area" levels.

Noise monitoring has indicated that background L_{AF90} noise levels may fall below the levels as outlined in Step 3, Chapter 4.4.2 of the EPA *Guidance Note on Noise from Scheduled* Activities (NG4), at the majority of locations and monitoring periods.

6.5 NOISE SURVEY PROTOCOLS

6.5.1 EIAR BASELINE NOISE SURVEY

A daytime, evening and night-time noise monitoring survey at noise sensitive locations surrounding the site was carried out. The noise survey was carried out in accordance with EPA 'Guidance Note on Noise (NG4)' (2016).

Monitoring was carried out by Martin O'Looney B.Sc. of Panther Environmental Solutions Ltd.

Daytime monitoring was carried out on Friday 13th May 2022 between 13:34pm and 18:52pm.

Evening time monitoring was carried out on Thursday 12th May 2022 between 19:48pm and 22:47pm.

Night-time monitoring was carried out between 23:08pm on Thursday 12th May and 03:05am Friday 13th May 2022.

Weather conditions during the survey were dry and calm with wind speeds of less than 5 m/s (the preferred limit for taking measurements).

The Sound Level Meters were also fitted with a windshield to minimise interference from meteorological conditions.

6.5.1.1 Monitoring Stations

Under current planning conditions, noise monitoring is carried out at the following locations:

- N1 – Noise Sensitive Receptor c.555m North of site boundary,
- N2 – Noise Sensitive Receptor c.975m North-East of site boundary,
- N3 – Noise Sensitive Receptor c.400m East of site boundary.

As part of this assessment, noise monitoring was carried out at two of the above locations and two additional locations surrounding the site:

- N1 – Noise Sensitive Receptor c.555m North of site boundary,
- N3 – Noise Sensitive Receptor c.400m East of site boundary,
- N4 – Noise Sensitive Receptor c.675m South-East of proposed site boundary,
- N5 – Noise Point c.740m South-West of proposed site boundary, to represent NSR along the local road c. 1km south of proposed site boundary.

The noise monitoring locations were based on recognised noise measurement criteria to give an accurate view and indication of the level of noise to which noise sensitive receptors are exposed, such as dwelling houses and public areas.

All measurements were taken at:

- 1.2 – 1.5m height above local ground level
- >3.50m away from reflective surfaces

Table 6.6: Noise Monitoring Grid Reference Locations

Location Ref	Monitoring Point Grid Ref		Closest NSR Grid Ref	
	Easting	Northing	Easting	Northing
N1	171980	107289	171882	107209
N2	172331	107635	172371	107667
N3	172577	106790	172678	106718
N4	172383	105660	172409	105753
N5	171292	105882	171376	105515

Grid Ref Source: https://irish.gridreferencefinder.com/

A map detailing the noise monitoring locations is provided in **Appendix 6.1.1**. ongoing?

6.5.1.2 Equipment Used

The equipment used for the noise monitoring was a Cirrus CR:171B Sound Level Meter, a Cirrus CR:831C Sound Level Meter and a CR:515 Acoustic Calibrator.

The CR:171B sound level meter was calibrated externally on 29th of July 2021. The CR:831C sound level meter was calibrated externally on 17th of August 2021. The CR:515 calibrator was calibrated externally on the 30th of July 2021.

A calibration check of 94 dB(A) at 1kHz was carried out on the instrument before and after measurement. The calibrator is a Class 1 grade, which conforms to IEC 60942:2003.

The difference between the initial calibration value, any subsequent calibration check, and a final calibration check on completion of measurements did not exceed 0.5 dB, and the instrument calibration was found to be satisfactory.

Measurement periods were appropriate to establish a typical noise level reading at each location in order to establish a dB(A) LAeq reading.

6.5.2 PL15/5484 NOISE MONITORING

Planning compliance noise assessments carried out by BHP Laboratories on behalf of Rockmills Limestone Quarry between January 2021 and May 2022 have been reviewed and are provided in **Appendix 6.2.1**.

Noise monitoring locations are discussed in **section 6.5.1** and a map is provided in **Appendix 6.1.1**.

6.5.3 PL15/5484 BLAST NOISE MONITORING

Quarterly planning compliance blast vibration and noise assessments between July 2020 and May 2022 have been reviewed and are provided in **Appendix 6.2.2**.

6.6 NOISE & VIBRATION MONITORING RESULTS

6.6.1 2022 NOISE ASSESSMENT RESULTS

Table 6.7: 2022 EIA Noise Assessment Results

Date	Location	Start Time	End Time	Period	LAeq,T	LAF_{10}	LAF_{90}	Description
12/05/2022	N1	19:48	20:18	Evening	45	47	36	Quarry was not operating, no activity noise. Frequent distant traffic noise from surrounding roads. Intermittent cattle lowing and bird calls.
12/05/2022	N3	20:42	21:12	Evening	42	45	34	Quarry was not operating, no activity noise. Traffic on nearby local road (7 vehicles during period). Frequent distant traffic noise from surrounding roads. Intermittent bird calls.
12/05/2022	N4	21:33	22:03	Evening	48	50	31	Quarry was not operating, no activity noise. Traffic on adjacent local road (6 vehicles during period). Frequent distant traffic noise from surrounding roads. Intermittent bird calls and cattle lowing in nearby sheds. Silage cutting occurring in nearby fields throughout.
12/05/2022	N5	22:17	22:47	Evening	34	35	25	Quarry was not operating, no activity noise. Intermittent distant traffic noise from surrounding roads. Distand tractor noise from silage cutting. Intermittent cattle lowing in nearby fields. Aircraft passing x1.
12/05/2022	N1	23:08	23:38	Night	34	37	24	Quarry was not operating, no activity noise. Intermittent distant traffic noise from surrounding roads. Intermittent leaf rustle from brief winds.
13/05/2022	N1	03:24	03:54	Night	25	26	20	

Date	Location	Start Time	End Time	Period	LAeq,T	LAF_{10}	LAF_{90}	Description
12/05/2022	N3	23:45	00:15	Night	32	37	26	Quarry was not operating, no activity noise. Intermittent distant traffic noise from surrounding roads. Intermittent leaf rustle from brief winds. Intermittent distant cattle lowing in fields during run 2.
13/05/2022	N3	02:47	03:17	Night	26	28	20	
13/05/2022	N4	00:24	00:54	Night	34	35	24	Quarry was not operating, no activity noise. Intermittent distant traffic noise from surrounding roads. Intermittent leaf rustle from brief winds. Frequent cattle lowing in nearby sheds during run 1.
13/05/2022	N4	02:07	02:37	Night	32	32	23	
13/05/2022	N5	01:00	01:30	Night	23	23	20	Quarry was not operating, no activity noise. Intermittent distant traffic noise from surrounding roads. Intermittent leaf rustle from brief winds. Intermittent distant dog barking during run 2.
13/05/2022	N5	01:32	02:02	Night	24	25	20	
13/05/2022	N1	11:14	11:44	Day	45	48	38	The quarry and lime production were occurring during the survey. No audible activity noise at this location during monitoring. Tractors operating and silage harvesting in local fields adding to noise levels. Frequent distant traffic noise from surrounding roads. Intermittent cattle lowing and bird calls. Aircraft passing during run 1.
13/05/2022	N1	16:54	17:24	Day	45	48	38	
13/05/2022	N1	17:39	18:09	Day	46	49	38	

Date	Location	Start Time	End Time	Period	LAeq,T	LAF_{10}	LAF_{90}	Description
13/05/2022	N3	11:50	12:20	Day	49	52	43	The quarry and lime production were occurring during the survey. Noise was audible from a site excavator, a front loader operating, lime mill, intermittent vehicle siren and the onsite generator. Noise from Crossmore Recycling was also audible, constisting mainly of vehicle trafficking, vehicle sirens and an onsite generator. HGV's from Rockmills Quarry and Crossmore Recycling entering and existing the site also added to noise levels during all three monitoring runs. Traffic on the local road was a dominant noise source: Run 1: Cars 6, HGV 13 (10 from site road) Run 2: Cars 8, HGV 1 from site road Run 3: Cars 5, HGV 1 from site road Frequent distant traffic noise from surrounding roads. Intermittent cattle lowing and bird calls.
13/05/2022	N3	15:35	16:05	Day	43	45	37	
13/05/2022	N3	16:20	16:50	Day	42	44	36	
13/05/2022	N4	12:29	12:59	Day	54	55	41	The quarry and lime production were occurring during the survey. No audible activity noise at this location during monitoring. Traffic on the local road was a dominant noise source: Run 1: Cars 1, HGV 6 (5 tractors, 1 lorry) Run 2: Cars 1, HGV 4 (tractors) Run 3: Cars 1, HGV 3 (tractors) Frequent cattle lowing in nearby sheds during all runs. Aircraft passing during run 1. Nearby milking parlor equipment operating during run 2&3.
13/05/2022	N4	14:12	14:42	Day	52	53	44	
13/05/2022	N4	14:57	15:27	Day	53	53	43	

Date	Location	Start Time	End Time	Period	LAeq,T	LAF_{10}	LAF_{90}	Description
13/05/2022	N5	13:06	13:36	Day	44	47	36	The quarry and lime production were occurring during the survey. No audible activity noise at this location during monitoring. Distant tractors operating and silage harvesting in fields adding to noise levels during all noise runs. Frequent distant traffic noise from surrounding roads. Intermittent cattle lowing and bird calls.
13/05/2022	N5	13:21	13:51	Day	44	46	38	
13/05/2022	N5	13:36	14:06	Day	43	45	38	

6.6.2 HISTORICAL NOISE ASSESSMENT RESULTS

Excerpts of results from planning compliance noise assessments between January 2021 and April 2023 of are provided in **Appendix 6.2.1**. The following table provides a summary of these results.

Table 6.8: Historical Noise Assessment Results

Ref	Date	Time	LAeq,T	L_{10}	L_{90}
N1	22/01/2021	14:33	48	50	41
N2	22/01/2021	14:38	46	48	33
N3	22/01/2021	15:16	39	40	31
N1	20/04/2021	13:14	46	48	38
N2	20/04/2021	13:19	41	43	32
N3	20/04/2021	13:51	34	36	27
N1	17/08/2021	13:14	47	49	38
N2	17/08/2021	13:19	49	49	37
N3	17/08/2021	13:51	40	43	34
N1	30/11/2021	11:10	52	54	46
N2	30/11/2021	11:14	49	52	38
N3	30/11/2021	11:53	40	42	32
N1	31/01/2022	11:47	53	53	46
N2	31/01/2022	11:50	45	47	37
N3	31/01/2022	11:53	42	43	36
N1	13/05/2022	11:19	55	59	44
N2	13/05/2022	11:24	54	51	41
N3	13/05/2022	12:01	43	46	37
N1	20/07/2022	11:58	51	53	43
N2	20/07/2022	12:32	53	54	38
N3	20/07/2022	13:09	41	44	36
N1	10/11/2022	13:16	55	59	46
N2	10/11/2022	13:50	59	64	54
N3	10/11/2022	14:32	50	51	41
N1	19/04/2023	13:28	48	46	32
N2	19/04/2023	13:25	61	54	36
N3	19/04/2023	14:06	42	41	32

6.6.3 HISTORICAL BLAST VIBRATION AND NOISE ASSESSMENT RESULTS

Excerpts of results from planning compliance blast vibration and noise assessments between July 2020 and February 2023 of are provided in **Appendix 6.2.2**. The following table provides a summary of these results.

Table 6.9: Historical Blast Vibration and Noise Assessment Results

Date	Blast Event	Monitoring Distance (m) from blast event	Seismic Velocity Vector Sum (mm/s)	Air Overpressure (dBL)
06/07/2020	1	340	1.2	130.2
06/07/2020	2	52	135.8	134.1
06/07/2020	3	247	4.8	134.9
02/09/2020		157	23.82	136.6
22/01/2021	1	379	0.82	128.2
22/01/2021	2	379	3.82	132.9
08/03/2021	1	316	1.43	126.7
08/03/2021	2	161	9.67	135.9
12/08/2021		241	7.61	131.6
24/11/2021		187	12.05	135.9
15/02/2022		212	5.8	126.9
06/05/2022		330	4.52	126.8
14/02/2023		412	1.36	114.4

6.7 PREDICTIVE NOISE ASSESSMENT

The International Standards Authority guidance ISO 9613-2:1996 has been used in the prediction of the propagation of potential noise and vibration from the proposed works and development to the nearest noise sensitive receptors.

6.7.1 SELECTION OF RECEPTOR LOCATIONS FOR PREDICTIVE NOISE

In order to predict the impact of the construction and operational phases of the proposed extension to the existing quarry, a predictive noise assessment has been carried out for the closest noise-sensitive locations. It is considered that this location would have the highest potential for impacts, while increased distance and undulating topography would reduce potential noise impacts at more distant locations.

Table 6.10: Noise Sensitive Receptor Locations

Location Ref. No.	Grid Reference (Easting: Northing)	Location Type	Location
N3 (NSL)	172678, 106718	Noise Sensitive Receptor	Noise Sensitive Receptor c.400m east of site boundary and c. 600m east of quarry centre.

The location of the proposed noise receptor location is shown in **Attachment 6.1**.

6.7.2 SOURCE NOISE SPECIFICATIONS & FORMULAE

Construction Noise

The proposed development is an extension to the extraction area of an existing quarry activity and would not include any additional services or infrastructure.

The noisiest aspect of the proposed development is likely to be the excavation activities and landscaping associated with the removal of overburden and the construction of the boundary berms. This is due to the lack of quarry walls or existing boundary earth berms to mitigate noise.

Following site preparation, the proposed new quarry area would be ready for the extraction operation.

The guidance document BS5228-Part 1 2009 (2014) "*Code of practice for noise and vibration control on construction and open sites. Noise*" provides typical noise levels for standard construction equipment during typical construction and demolition activities.

The typical noise level of construction plant is summarised in the following table.

Table 6.11: Construction Plant Noise Levels (Ref: BS5228:2009)

Sound Pressure Level (dBA) @ Octave Band Centre Frequency									
Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
C2.3 - 22T Excavator (clearing site) @ 1 m	75	88	88	91	93	92	91	86	99
C2.14 - 22T Excavator (excavating) @ 1 m	80	83	89	91	92	90	85	21	97
Maximum Noise Level	**75**	**88**	**88**	**91**	**93**	**92**	**91**	**86**	**99**

Operational Noise & Vibration

The operation of the extension to the extraction area of an existing quarry activity and would be a continuation of the existing operation. This is described in detail in **Chapter 2.0** of this EIAR.

Long term quarterly planning condition noise monitoring and a baseline noise assessment were carried out during the operation of the existing quarry. These noise and vibration results are provided in **section 6.5**and is discussed in **section 6.8**.

Relevant Formulae

In order to carry out this predictive analysis, the following attenuation characteristics have been taken into account:

Divergence – A_{div}

The geometrical divergence accounts for the spherical spreading in the free field from the point sound source, causing attenuation due to the inverse square law. Divergence is calculated as follows:

$$A_{div} = 20 \log_{10} (d/d_0)$$

Where:

d is the distance from the source to the receiver (m)
d_0 is the reference distance (1 m)

6.7.3 CONSTRUCTION NOISE IMPACT ASSESSMENT RESULTS

Table 6.12: Construction Noise Impact Results

Nearest Sensitive Receptors		Worst - Case LAeq (dBA)	Distance from Construction Boundary (m)	Distance Attenuation (dBA)	Predicted Worst-Case Construction Noise (dBA)
NSR1	House near boundary along Standhouse Road (L7037)	99	575	55.2	43.8

$Dist = (Xr-Xs)_2+(Yr-Ys)_2$ when s = source & r = receptor

$A_{div}=20.Log\ (d/do)$ when d = distance & d_o = 1m

$LAeq = L_{(s)} - A_{div}$ when $L_{(s)}$ = source noise level

6.7.4 OPERATIONAL BLAST NOISE & VIBRATION

The attenuation of vibrations with distance is composed of two factors: geometric damping and material damping. The geometric damping depends on the type and the location of vibration source and the material damping is related with ground properties and vibration amplitude (*Dong-Soo Kima et al (1999)*). Regarding geometrical divergence, the inverse square law states that for a point source of waves that is capable of radiating omnidirectionally and with no obstructions in the vicinity, the intensity I decreases with the square of the distance, d, from the source.

The following graph details the distance and vibration as provided in **Table 6.9** above. The excel generated best fit line indicates an approximate corelation with the inverse square law (x^{-2} or $1/x^2$).

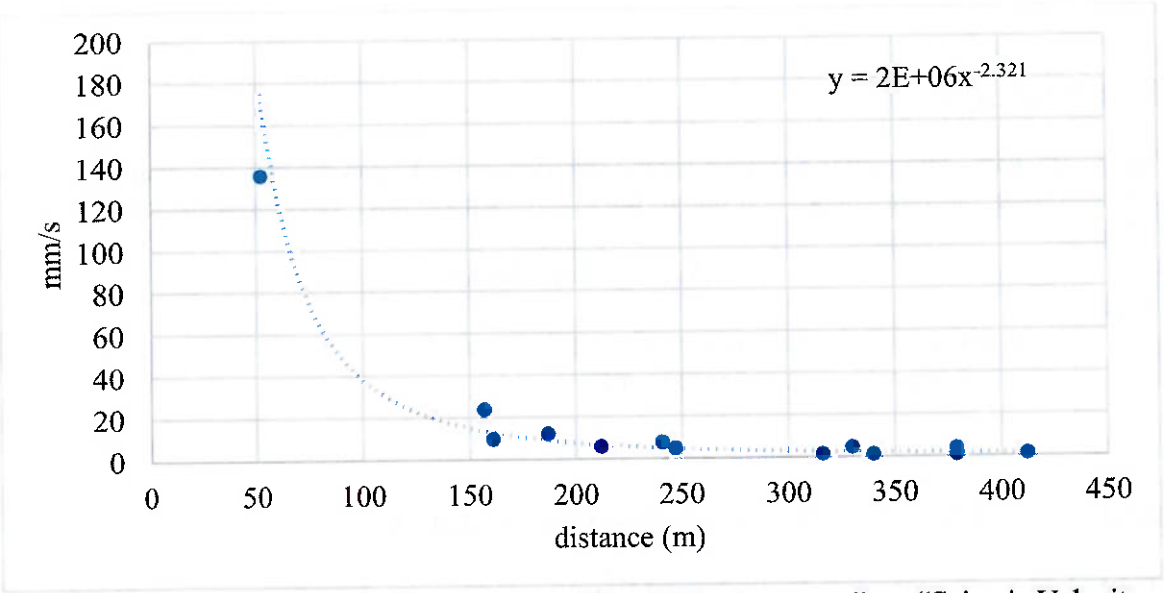

Figure 6.1: Graph of "Monitoring Distance (m) from blast event" vs. "Seismic Velocity Vector Sum (mm/s)"

The blasting records do not detail the exact location of blasting or monitoring during each event. In order to provide an estimate of the noise and vibration impact at the closest sensitive receptor, it has been assumed that the blast event occurred at the centre of the existing quarry, and a distance of 600m from the centre to the receptor.

The following tables estimate vibration and noise levels at the closest receptor location using geometric divergence alone. Other potential mitigating effects, such as material damping for vibration and barrier effects or ground effects for noise, have not been considered. It is noted in particular that, with blasting events within the quarry area, a barrier effect of up to 10 dB would be expected from the quarry walls (precise barrier effect would be dependent upon the noise source, barrier and receptor relative distances and orientation).

Table 6.13: Estimated Blast Vibration and Noise Assessment Impacts

Date	Event	Distance (m) from blast event	Monitored Seismic Velocity (mm/s)	Monitored Air Overpressure (dBL)	Estimated Distance (m) from receptor	Estimated Receptor Seismic Velocity (mm/s)	Estimated Receptor Air Overpressure (dBL)
Limits @ NSL			-	-		**12**	**125**
06/07/2020	1	340	1.2	130.2	600	**0.39**	**125.3**
06/07/2020	2	52	135.8	134.1	600	**1.02**	**112.9**
06/07/2020	3	247	4.8	134.9	600	**0.81**	**127.2**
02/09/2020		157	23.82	136.6	600	**1.63**	**124.9**
22/01/2021	1	379	0.82	128.2	600	**0.33**	**124.2**
22/01/2021	2	379	3.82	132.9	600	**1.52**	**128.9**
08/03/2021	1	316	1.43	126.7	600	**0.40**	**121.1**
08/03/2021	2	161	9.67	135.9	600	**0.70**	**124.5**
12/08/2021		241	7.61	131.6	600	**1.23**	**123.7**
24/11/2021		187	12.05	135.9	600	**1.17**	**125.8**
15/02/2022		212	5.8	126.9	600	**0.72**	**117.9**
06/05/2022		330	4.52	126.8	600	**1.37**	**121.6**
14/02/2023		412	1.36	114.4	600	**0.64**	**111.1**

6.8 IMPACT ASSESSMENT

6.8.1 NOISE IMPACT ASSESSMENT – DISCUSSION

The site is located in a rural, farming area predominantly comprised of farmsteads, farm hubs, pastureland and hedgerows / treelines. Residential development in the area is predominantly linearly aligned along the existing road network.

The principal factor influencing the mitigation of noise from the proposed development is its distance from noise sensitive locations. The closest noise sensitive receptors are located adjacent to the access from the local road.

The terrain between the closest noise sensitive receptors and the proposed extension is generally composed of mature hedgerows, treelines and grassland. Gently rolling hills in the area also would provide additional noise attenuation. For the purpose of noise attenuation, these surfaces are considered *'porous'*, whereas made ground would be considered *'reflective'*. The combination of these factors would also contribute to the mitigation of noise from construction activity.

6.8.1.1 Construction Phase

The construction phase of the proposed development would be a relatively simple operation, consisting of site clearance, topsoil removal and the construction of boundary earth berms.

The works would occur on a phased basis over the 10 year lifetime of the proposed planning permission. The initial overburden removal activities would be used to establish earth berms at the boundaries of the proposed extraction area.

This activity would occur periodically, for a short period of time (2-3 days) and would be of a similar character of plant noise as the current site noise environment. At the closest noise sensitive receptor, calculated maximum construction noise levels are predicted to achieve 44 dBA.

This noise level would be below the recommended NRA construction noise limit of 70 dB at the assessed sensitive receptor during fieldworks.

The calculated maximum construction noise level would also comply with the EPA recommended and 15/5484 Planning Condition daytime noise limit of $L_{Aeq,T}$ 55 dB.

Therefore, there would be no significant noise impacts during the construction phase.

6.8.1.2 Operational Phase

The hours of operation of the quarry are 07:30 hrs to 18:00 hrs, Monday to Friday and 07:30 hrs to 16:00 hrs on Saturdays.

The operation of the extension to the extraction area of an existing quarry activity and would be a continuation of the existing operation. It is not proposed to increase current extraction rates. This would consist of the breaking of oversized stones with a hydraulic rock breaker, transport of blasted stone via excavator and front-loader to the crushing machine and screening machine, the transport of graded stone to stockpiles, the loading of transport lorries, the operation of the agricultural lime hopper and lime mill, and the operation of the onsite generator.

The highest noise activities are generally located within the floor of the quarry, where the quarry walls act as an effective noise barrier. The quarry operation is also located at a sufficient set back distance from noise sensitive receptors.

It is noted that, as a continuation of existing quarrying operations and at existing extraction rates, it is not expected that there would be a significant change to the current noise environment of the area.

The baseline daytime noise assessment on the 12th May 2022 and the Planning condition noise monitoring shown in **Table 6.7 and Table 6.8** were carried out while quarrying operations were ongoing.

All LAeq noise results were found to be in compliance with the EPA recommended and 15/5484 Planning Condition daytime noise limit of $L_{Aeq,T}$ 55 dB.

Therefore, there would be no significant noise impacts from normal activities during the operation phase.

6.8.1.3 Site Restoration Phase

As described in **section 2.4.2** of this EIAR, the restoration of the site would be primarily comprised of the redistribution of stockpiled materials over the phased restoration areas, as detailed in Chapter 2.

In terms of noise emissions, this would constitute the operation of front loaders and an excavator. The initial restoration would occur at the existing surface ground level, restoring area 1R to pasture. Subsequent restoration phased would occur within the floor of the quarry and would comprise of distributing waste rubble and soil to establish mixed natural habitats.

Maximum noise emissions would be similar to those occurring during the construction period, and would comply with NRA, EPA and Planning Permission 15/8484 noise limits. No significant noise impacts would be anticipated at sensitive receptors.

6.8.2 BLAST NOISE & VIBRATION IMPACT ASSESSMENT – DISCUSSION

Blasting is carried out by a contracted blasting expert approximately every 3-4 months based on demand.

As per 15/5484 planning conditions, each blasting event is required to be monitored at the boundary of the quarry. Blasting operations are limited to within the hours of 09:00 hrs to 18:00 hrs Monday to Friday, excluding public holidays, bank holidays and weekends. The frequency of blasting may not exceed 1 blast per month.

As detailed in **Table 6.13**, estimated vibration levels at the closest receptor location would be in compliance with the 12 mm/s 15/5484 Planning Condition limit.

While **Table 6.13**, indicates that there may be exceedances of the 125 $dB_{(L_{in})max.\ peak}$ 15/5484 Planning Condition limit, it should be noted that this estimate only considers attenuation due to distance from the source to the receptor. It is considered likely that the estimated exceedances of 1 to 4 dB would be mitigated by the barrier effect of quarry walls (up to an expected practical 10 dB attenuation), and ground absorption, as was evident from typical operational noise results.

It is noted that this is an established activity, with intermittent blasting operations being a characteristic of the existing noise environment for approximately 7 years (as of planning reference 15/5484). All current controls and practices currently in place would be continued for the proposed quarry extension, It is also noted that there are no complaints on record for the quarry for noise or blasting operations, which would indicate no significant impact on the amenity of the area.

Therefore, it is determined that there would be no significant noise impacts from blasting activities during the operation phase.

It is recommended that any potential future blast noise and vibration monitoring be carried out at a location representative of the closest receptor location. This will allow for direct verification of results against planning condition limits.

identify blast noise monitoring locus

6.8.3 CUMULATIVE IMPACTS

A list of the primary anthropogenic noise sources in the area is included in **section 6.4.1**. The closest currently operating quarry to the proposed quarry extension is Lagans Cement, approximately 4.5km East.

It is not considered that there would be any significant cumulative noise or vibration impacts between these sites at this distance.

There are no know proposed new quarries within the vicinity of the proposed quarry extension.

It is noted that this proposal is for continuation and extension of an existing quarry activity. Therefore, the proposed development would result in this quarry activity continuing to contribute to the existing noise environment over the proposed 10 year planning permission.

6.8.4 "DO-NOTHING" IMPACTS

Should the proposed development not be permitted, the current 10 year planning permission (15/5484) would lapse in 2025. Onsite operations, including noise and vibration characteristics, would continue within this time frame until the available stone resource is exhausted.

As current and proposed operations have been determined to be having no significant impact upon the noise and vibration environment, there would continue to be no significant impacts within this period.

Following this period, the quarrying operation would cease with no further noise or vibration emissions from the site.

6.9 MITIGATION MEASURES

The following mitigation measures would be proposed for the operational phase of the proposed project:

- It is recommended that guidance on control of noise, as per The National Roads Authority's 'Guidelines for the Treatment of noise and vibration in National Road Schemes' (2004) and British Standard 5228-1 'Code of practice for Noise Control on Construction and Open Sites' be followed during the construction phase

- It is recommended that any potential future blast noise and vibration monitoring be carried out at a location representative of the closest receptor location. This will allow for direct verification of results against planning condition limits.

6.10 DIFFICULTIES ENCOUNTERED

No difficulties were encountered during the assessment.

6.11 REFERENCES

EPA, Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), 2016.

EPA, Environmental Noise Survey Guidance Document, 2003.

ISO 9613-2:1996 Attenuation of Sound during Propagation Outdoors.

EN BS 4142:2014 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas".

EN BS 5228-1:2009 Code of practice for noise and vibration control on construction and open sites.

National Roads Authority, Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, 2014.

Grant S. Anderson and Ulrich J. Kurze, *Outdoor Sound Propagation*, Chpt. 5 in Noise and Vibration Control Engineering – Principals and Applications, edited by L.L. Beranek and I.L. Vér, (John Wiley & Sons, NY, NY 1992).

Dong-Soo Kima et al (1999) "Propagation and attenuation characteristics of various ground vibrations" Soil Dynamics and Earthquake Engineering 19 (2000) 115–126, 27 December 1999 accessed from: http://www-classes.usc.edu/engr/ce/599/Thesis/aa.pdf

7.0 LANDSCAPE AND VISUAL ENVIRONMENT

7.1 INTRODUCTION

This chapter of the EIAR provides an assessment of the likely landscape and visual impacts of the proposed development. This assessment involved a detailed review of all plans, sections and elevations of the proposed scheme and various publications and reports, together with a visit to the proposed site and its environs.

7.2 METHODOLOGY

This assessment is made with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development. The methodology used in the assessment is based on the EPA's '*Guidelines on the information to be contained in Environmental Impact Statements, 2002*', '*Advice Notes on Current Practice in the preparation of Environmental Impact Statements, 2003*' and draft '*Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017*'.

7.2.1 BASELINE STUDY METHODOLOGY

The proposed development is located within the undulating plains of northern Co. Cork. Due to the landscape and intervening hedgerows/treelines, the sightlines would generally be limited to 1 km. However, where increased sightline distances are available due to rises, it is not likely that significant visual impacts would be likely beyond 4km.

Potential viewpoints were established using online mapping sources. These were investigated along with all other potential viewpoints identified during the site survey.

The site survey was carried out on Friday 13th May 2022 in clear weather conditions. The visibility assessment concentrated on the publicly accessible areas such as road networks, residential and amenity areas.

Desktop and fieldwork was supported by online mapping tools from Bing, Google, OSI, MyPlan and the Mayo County Development Plan 2021-2027 and the Landscape Appraisal of County Mayo 2008.

Photographs illustrating views from viewpoints were taken using a Canon EOS 1100D Digital SLR Camera. Viewpoint photos can be found in **Attachment 7.1**.

7.2.2 LANDSCAPE ASSESSMENT CRITERIA

With regard to landscape assessment, there are two separate but closely related aspects. The first aspect is visual impact, i.e. the extent to which a new structure in the landscape can be seen. Visual impacts may be categorised under *'Visual intrusion'* and *'Visual Obstruction'*, where:

Visual intrusion is impact on a view without blocking, and
Visual obstruction is impact on a view involving blocking thereof.

In assessing visual impact, various aspects and stages are considered in detail including, impact during phasing, impact on completion and longer term established impact.

The second aspect is **impact on landscape character,** i.e. responses that are felt towards the landscape and drawn on the appearance of the land, including aspect, land-use topography, vegetative cover etc. and their interaction to create specific patterns and landscape units distinctive to particular localities. The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, vegetation, land-use, built environment together with the visibility of and the views to and from the landscape.

The significance criteria used in the assessment are based on the impact levels suggested in the EPA Guidelines on the information to be contained in EPA's *'Guidelines on the information to be contained in Environmental Impact Statements, 2002'*, and draft *'Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017'*, which are set out in this volume of the EIAR.

7.3 EXISTING ENVIRONMENT

7.3.1 LANDSCAPE SETTING OF THE PROPOSED SITE

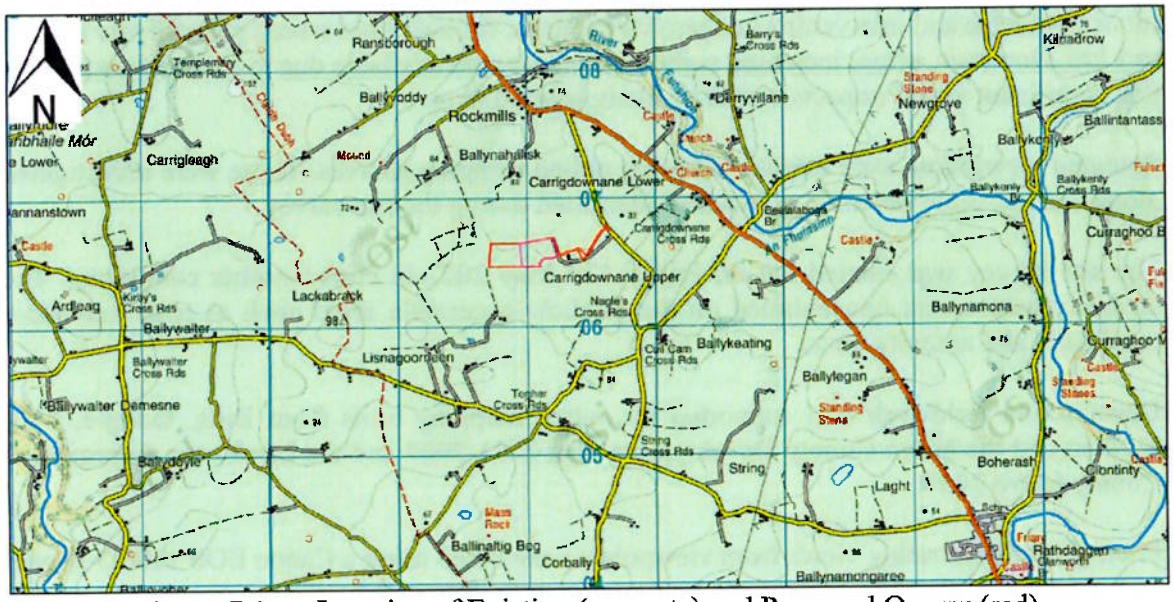

Figure 7.1: Location of Existing (magenta) and Proposed Quarry (red)

The proposed development is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by mature broadleaf hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape.

Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Large farmyard complexes are common in the area and are generally composed of barrel or A-shaped sheds with green or dark finish, many including feed type silos either of unfinished stainless steel or green/dark finish.

The proposed development site is located in an area bordered by the Nagle mountains to the south, Ballyhour and Galtymore mountains to the north and the Kilworth mountains to the east. Within the 4 km study area, the landscape is composed of gently undulating hills and ridgelines reaching from valleys of approximately 70m AOD to rises of 80-100m AOD.

The proposed site is located on the northern slope of a gentle ridgeline, oriented approximately east -west. The existing and proposed development area slopes from an approximate elevation of 85m above sea level at the southern site boundary to an approximate elevation of 74m above sea level at the northern site boundary.

Due to the undulating topography, as well as mature vegetation throughout the study area, the landscape is somewhat enclosed, providing predominantly limited views. There are however, a number of elevated locations where distant views open up and the scale of the landscape increases.

The undulating topography and abundant mature vegetation provides good screening potential for low-rise development, provided they are similar in scale to the development which is typical within this landscape.

7.3.2 LANDSCAPE PLANNING SETTING

7.3.2.1 Landscape & Scenic Planning Information

A landscape character assessment was undertaken as part of the Cork County Draft Landscape Strategy (2007) which has been incorporated within the Cork County Development Plan 2022-2028.

The proposed development site is located in the Landscape Character Type (LCT) 5 – Fertile Plain with Moorland Ridge, as shown in **Figure 7.2**.

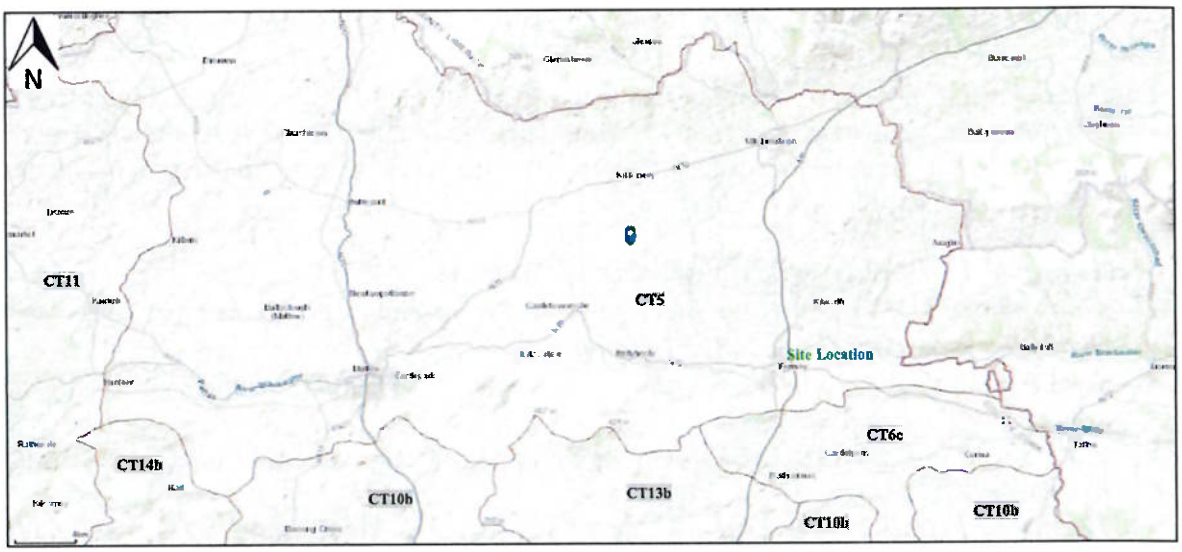

Figure 7.2: Location of Site within Landscape Character Type

The landscape description of LCT5 from the Cork County Draft Landscape Strategy, 2007, includes the following:

"This landscape is generally referred to as the "Golden Vale" and occupies a substantial proportion of northeast Cork. This is a low lying landscape, which comprises an extensive area of predominantly flat or gently undulating topography along the River Blackwater, and which is contained in its periphery by low ridges. The latter include the southern slopes of the Ballyhoura and Galtee Mountains to the north, the northern slopes of the Nagles to the south and the western ridges of the Knockmealdown Mountains. The bedrock of the plain comprises mostly of limestone while sandstone typically forms the underlying geology of the peripheral ridges. Lower ground comprises brown earths and the occasional gley while brown podzols are located at slightly higher levels.

These physical conditions create a fertile and verdant landscape well suited to intensive farming. It is this activity and the planar landform, which give the landscape its characteristic rectilinear mosaic of large sized fields. This mosaic is articulated by the field boundaries comprising mostly mature broadleaf hedgerows but also scrub species such as gorse. Articulation also results from the variation in colour arising from alternative use, whether dairying or arable. Occasional small blocks of coniferous plantations introduce a patchy landcover pattern to hills and ridge tops.

The landscape is also characterised by many old demesnes comprising, for example, high stone walls, broadleaf avenues and open parkland. Several large settlements are found within the area, including Mallow, Charleville, Mitchelstown and Fermoy, all of which developed on the basis of the high agricultural productivity of the surrounding countryside.

Farmsteads are scattered throughout the landscape, comprising large houses, traditional barns, barrel shaped metal roofed sheds and slatted sheds with A-shaped roofs. Such building complexes are typically partially screened by the mature hedgerows. The landscape is one of high fertility and, thus, productivity. It is a "working" landscape, manifesting the human bond with the land through agricultural activity. Because of its flatness the landscape might be described as 'calm'. While this even and vast extent can best be perceived from an elevated location, views are otherwise curtailed by the prevalent tall hedgerows when viewed on the plain."

Landscape Character Type 5 – Fertile Plain with Moorland Ridge, is classed as being of "Very High" Landscape Value and of "County" Landscape Importance. This area is further classed as being of a "Very High" Landscape Sensitivity, i.e. "*Extra vulnerable landscapes which are likely to be fragile and susceptible to change.*"

The following are listed as key characteristics of this LCT:

- *Broad plain defined by the River Blackwater with moorland ridges to the north and south*
- *Highly intensive dairying and tillage region.*
- *Mature broadleaf hedgerows on plain with patches of coniferous forestry on higher ground.*
- *Good range and diversity of habitats many of which are contained along the Rovers Blackwater and Awbeg.*
- *The main natural features of the Rivers Blackwater and Awbeg have largely remained intact and their preservation in the future is vital for the developing tourism sector in the region.*

Landscape Character Areas

The 16 Landscape character types in the Landscape Strategy further sub-divided into 76 Landscape Character Areas (LCAs). The proposed development is located within LCA 62 - The Golden Vale (Moorland Ridge and Broad Undulating Patchwork Middle Valley), and provides the following description:

"The human influence on this landscape is more keenly felt than in the other two landscape character areas and it provides a mastering of nature through the ordered and formal layout of field patterns."

Draft Landscape Strategy Recommendations

The following general recommendations from the Landscape Strategy are relevant to the proposed development:

- *Recognise that the lowlands are made up of a variety of working landscapes that are critical resources for sustaining the economic and social well-being of the county.*
- *Reflect existing vegetation species and patterns in new planting schemes in this LCT.*
- *Encourage further planting of deciduous trees as they are a dominant feature in this landscape and their continuation is important in retaining the character of this landscape.*
- *Minimise disturbance of hedgerows in rural areas. Encourage appropriate landscaping and screen planting of proposed developments by using predominately indigenous/local species and groupings*
- *Ensure that the approach roads to the towns and villages in this LCT are protected from inappropriate development which would detract from the setting of these settlements.*

High Value Landscapes

The 2022 CDP identifies Landscape Character Types which have a very high or high landscape value and high or very high landscape sensitivity and are of county or national importance are considered to be our most valuable landscapes and therefore are designated as High Value Landscapes (HVL).

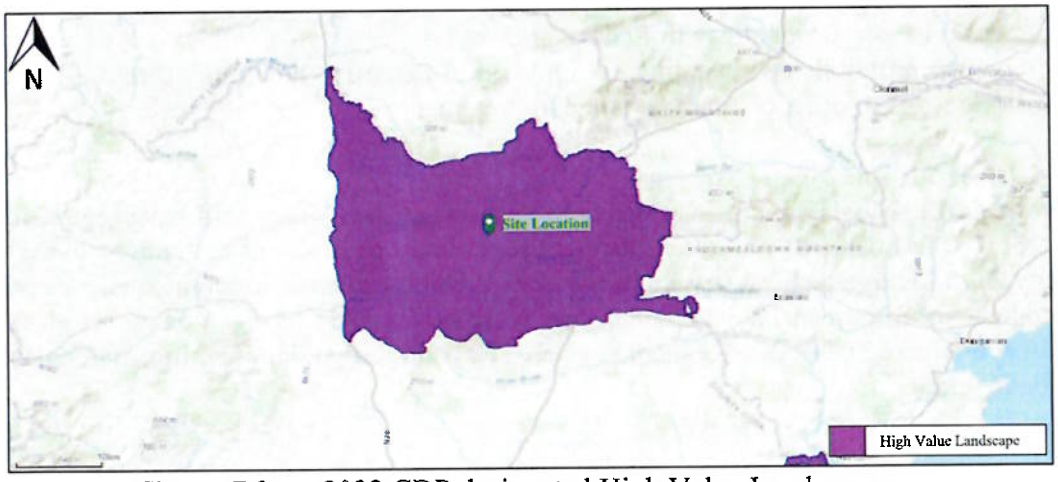

Figure 7.3: 2022 CDP designated High Value Landscapes

Scenic Routes

Designated scenic routes are indicated within the 2022 Cork County Development Plan online map browser, and are illustrated in **Figure 7.4** below.

There are no scenic routes within the study area.

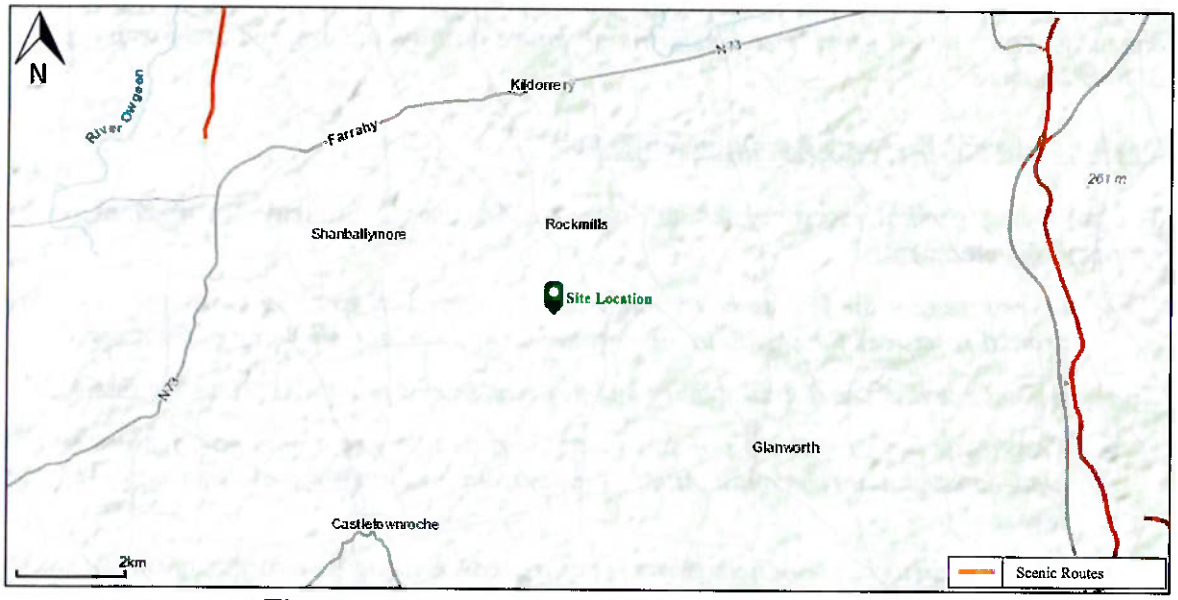

Figure 7.4: 2022 CDP designated Scenic Routes

7.3.2.2 2022 Cork CDP Landscape Policies & Objectives

Volume 1, Chapter 14 of the 2022 Cork County development Plan outlines several objectives in relation to landscape:

GI 14-9: Landscape
a) Protect the visual and scenic amenities of County Cork's built and natural environment.
b) Landscape issues will be an important factor in all land-use proposals, ensuring that a pro-active view of development is undertaken while protecting the environment and heritage generally in line with the principle of sustainability.
c) Ensure that new development meets high standards of siting and design.
d) Protect skylines and ridgelines from development.
e) Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments.

GI 14-10: Draft Landscape Strategy
Ensure that the management of development throughout the County will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimize the visual and environmental impact of development, particularly in areas designated as High Value Landscapes where higher development standards (layout, design, landscaping, materials used) will be required.

7.4 CHARACTERISTICS OF THE PROPOSAL

The applicant, Dennis O'Keefe, proposes to carry out a series of modifications to the site, as set out in detail in Chapter 2 of this EIAR.

The proposed development entails continuation of the existing operation, a 3.84 hectare extension of the existing 2.923 ha quarry extraction area, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork. Including all yards, services, boundaries and earth berms, the extension would add 4.21 ha to the current 4.718 ha site area.

Over the course of the proposed 10 year planning permission, the quarrying excavation operation would extend progressively westward. As part of restoration works to be completed under 15/5484, a part of the existing services area at the upper level would be restored to pastureland with new earth berms bounding the quarry pit. The berm would be planted with native hedgerow species. The restoration of a portion of the internal quarry pit to mixed natural habitats would not be visible outside the site, due to screening from quarry walls.

Quarry works and stockpiles would continue be located within the quarry floor, which is at 64m AOD (c. 10-21m below surrounding ground levels).

The proposal includes 2m (high) x 6m (wide) boundary earth berms surrounding the proposed quarry extension. The berms will be planted with a double line of hawthorn whips has been planted at 1m spacing. When planting has become established this will provide additional visual screening and assimilation with surrounding vegetation. Supplemental planting would also occur on existing hedgerows and treelines.

The restoration phase of the quarry development would occur progressively as the extraction continues as detailed in M&McC Engineers drawing 221099-P06 submitted with the application. This includes restoration works to be competed by the end of 2025 in accordance with PL15/5484.

The area designated as 1R, an area of the existing services area at existing ground levels, would be restored to pasture. Areas designated at 2R and 3R would be restored using waste stone and topsoil to promote mixed habitats and biodiversity. The approach would allow for the establishment of pioneering flora of local provenance whilst providing some cover for a variety of species. If material is available onsite (i.e. excess waste stone or soil) the maximum area possible would be restored with a minimum 1m of soil with sloped stone rubble verges, extending into the area designated as 6R.

The current restoration plan reserves the areas designated 4R (services yard) and 5R (ramp, quarry equipment and stockpile) areas for potential future extension planning permission.

7.5 IMPACTS

7.5.1 IMPACT ASSESSMENT

The assessment of potential visual amenity impacts involved examining the locations of domestic dwellings, views from public roads and the location of the proposed development. In assessing the impact, potential impacts associated with both the construction and operational phases were considered.

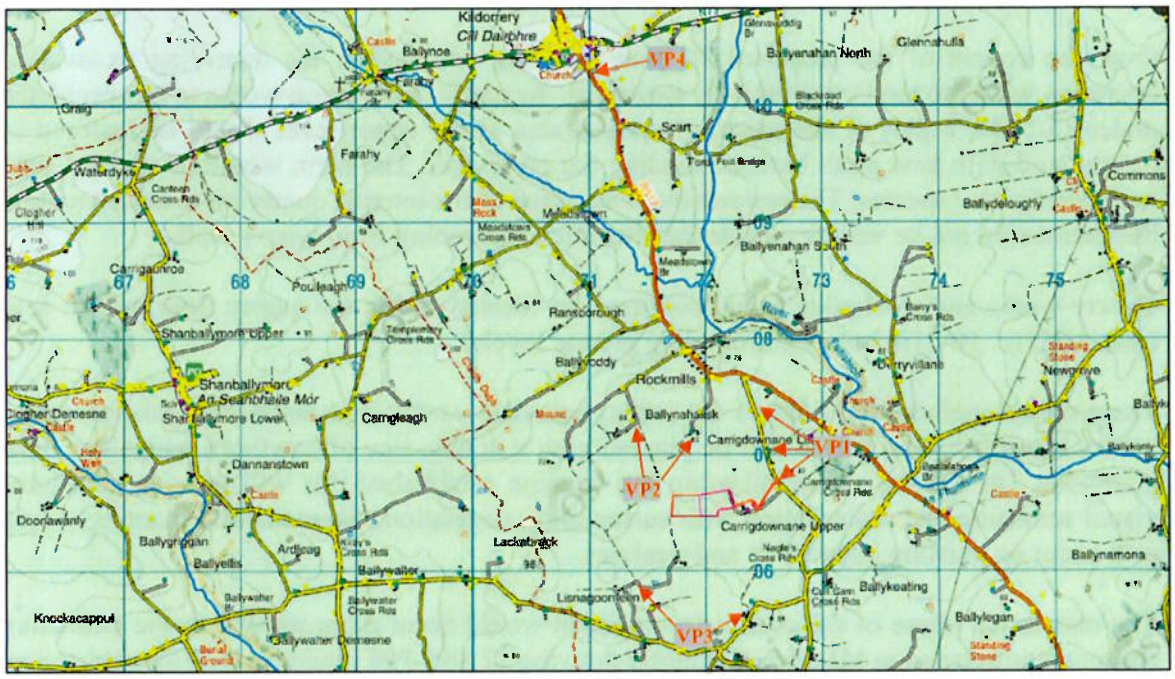

Figure 7.5: Viewpoint locations within the Study Area

The site survey of local roads, residence locations and public areas has identified 4 representative viewpoints. Photos of these viewpoints are presented in **Appendix 7.1**.

VP1 represents intermittent views of the site along the L5612 road approach to the site, ranging from 1km to 400m from the site. Views from the junction with the R512 and the initial section of the L5612 road are obscured by intervening topography. Within 500m of the site entrance, the site becomes a more substantial visual feature without screening from folds in the land and relatively sparce treeline / hedgerow on the western road boundary.

The buildings, constructed of green cladding, of the adjacent Crossmore Recycling business are the most prominent visual feature in the vicinity of the site.

At present, the most visually prominent features of the existing quarry development are the grey clad agricultural limestone storage shed, stockpiles in the raised services yard and the upper sections of the overburden stockpiles, which extend above the screening of the 2m boundary earth berm. However, it is noted that as current boundary planting becomes established, these features will become less prominent and the site screening would merge with the existing hedgerows and treelines in the landscape.

During the construction phase, as described in **section 7.4** above, the primary change to the existing visual features of the site would be the extension of the 2m high boundary earth berms to the west.

There would be a moderate visual impact due to the extended boundary earth berms. However, this would be effectively mitigated through the proposed planting with grass and hedgerow on the berms, and supplemental planting of existing hedgerows. This planting would merge with the recent planting for screening of the quarry buildings and current quarry area.

During the operational phase, the majority of works would be obscured from view by the quarry faces and boundary earth berms. There would be no change to the existing visible buildings and infrastructure of the site.

The main potential change would be additional overburden stockpiles, which may be visible above the boundary screening. It is recommended that inactive overburden stockpiles are planted with grass in order to mitigate these as a visual feature.

However, existing overburden stockpiles would be depleted through 2024 to restore previous worked areas, as per the restoration plan.

Following the establishment of planting in the proposed extension and restored area, there would be an improvement to the visual impacts of the development due to the screening of internal buildings and quarry pit. There would be no significant impact to the or landscape character of the area.

VP2 represents intermittent views of the site which are available at prominences within 1km north of the site. These views are very limited due the small number prominences lacking intervening topography and screening provided by roadside hedgerows and treelines. The most significant of these would be from the closest residence c.550m north of the site.

As described above, the most prominent visual features in the vicinity of the site are the adjacent Crossmore Recycling business buildings.

At present, the most visually prominent features of the existing quarry development are the grey clad agricultural limestone storage shed, stockpiles in the raised services yard and the upper sections of the overburden stockpiles, which extend above the screening of the 2m boundary earth berm. Current boundary planting will become more established and these features will become less prominent and the site screening would merge with the existing hedgerows and treelines in the landscape.

These viewpoints are at a similar elevation as the existing and proposed site, allowing the existing and proposed boundary earth berms to have a good effect, screening the existing excavation area.

During the construction phase/s, as described in **section 7.4** above, the primary change to the existing visual features of the site would be the extension of the 2m high boundary earth berms to the west.

During the operational phase, the majority of works would be obscured from view by the quarry faces and boundary earth berms. There would be no change to the existing visible buildings

and infrastructure of the site. Additional overburden stockpiles may also be visible above the boundary screening, while existing overburden stockpiles would be restored and would no longer be in place.

Due to the orientation of the proposed extension to the west, this extension would comprise a larger visual element in the landscape at locations to the north. Therefore, there is a potential for a moderate to major visual and landscape impact at these viewpoints.

Potential visual impacts from the extended earth berms and the exposed southern working face would be mitigated through the proposed planting with grass and hedgerow on the berms, and supplemental planting of existing hedgerows. This planting would merge with the recent planting for screening of the quarry buildings and current quarry area.

It is recommended that inactive overburden stockpiles are planted with grass in order to mitigate these as a visual feature.

Following the establishment of planting, it is considered that there would be a minor impact to the existing visual amenity or landscape character of the area.

VP3 represents residences and public areas oriented south of the site. The proposed development is located on the northern slope of a ridge oriented approximately west-east. Views of the site for the south are obscured by this ridge. There were no viewpoints to the proposed development within the study area.

VP4 represents residences and public areas oriented south of Killdorrery Village, c. 4km north of the site. Killdorrery Village is located on a c. 110m AOD prominence which provides expansive views of the surrounding landscape. However, these views are limited to the higher elevations of the village topography and are obscured by local buildings, hedgerows and private garden trees.

The primary identifiable features are the adjacent Crossmore Recycling business buildings. However, the existing quarry grey clad agricultural limestone storage shed, stockpiles in the raised services yard and the upper sections of the overburden stockpiles are identifiable. As previously stated, as current boundary planting becomes established, these features will become less prominent and the site screening would merge with the existing hedgerows and treelines in the landscape.

These viewpoints are oriented to the north of the site, and therefore have similar properties as VP2 viewpoints. However, this is somewhat mitigated due to the increased distance.

During the construction phase/s, as described in **section 7.4** above, the primary change to the existing visual features of the site would be the extension of the 2m high boundary earth berms to the west.

During the operational phase, the majority of works would be obscured from view by the quarry faces and boundary earth berms. There would be no change to the existing visible buildings and infrastructure of the site. Additional overburden stockpiles may also be visible above the boundary screening, while existing overburden stockpiles would be restored and would no longer be in place.

Potential visual impacts from the extended earth berms and the exposed southern working face would be mitigated through the proposed planting with grass and hedgerow on the berms, and supplemental planting of existing hedgerows. This planting would merge with the recent planting for screening of the quarry buildings and current quarry area.

It is recommended that inactive overburden stockpiles are planted with grass in order to mitigate these as a visual feature.

Following the establishment of planting, it is considered that there would be a negligible impact to the existing visual amenity or landscape character of the area.

7.5.2 REHABILITATION PHASE IMPACTS

Under the current 15/5484 rehabilitation phase, to be completed in 2024/2025, the northern section of the existing services yard would be restored to pastureland. The restoration area within the quarry pit would be restored to mixed habitats which would develop through natural recolonisation.

While the restored mixed natural habitats within the quarry pit would not be visible outside the site, the restoration of the northern section of the services yard to pasture would be visible beyond the site. During restoration of this area and berms, and prior to establishment of grass and hedgerow plantings, there would be a slight to moderate visual impact due to the are of exposed earth.

Following the establishment of planting in the proposed extension and restored area, there would be an improvement to the visual impacts of the development due to the screening of internal buildings and quarry pit. There would be no significant impact to the or landscape character of the area.

The proposed pastureland would be in keeping with the existing landscape character of the area.

The rehabilitation phase of the current quarry extension would occur primarily within the quarry pit area, and would not be visible outside the site boundary. There would be no significant visual impacts from this stage of the development. The progressive weathering of exposed rock and the establishment of pioneering flora on soil, rubble and compacted soil (wetland / temporary wetland) within the natural regeneration area would develop this area into a beneficial landscape and biodiversity feature.

Following the establishment of planting and natural colonisation, there would be a positive landscape impact from the proposed development.

7.5.3 CUMULATIVE IMPACTS

The closest currently operating quarry to the proposed quarry extension is Lagans Cement, approximately 4.5km East. There are no similar developments within the vicinity of the site.

7.5.4 "DO-NOTHING" SCENARIO

Should the proposed development not proceed there would be no impact to the visual amenity of the area.

It is not considered that there would be any significant cumulative landscape or visual impacts.

7.5.5 LANDSCAPE AND VISUAL IMPACT SUMMARY

Given the nature, location, existing and proposed mitigation measures of the proposed site, it is considered that the proposed development would result in no significant overall long–term negative landscape and visual impact.

As a result, it is considered that the proposal may be viewed as having an acceptable level of landscape and visual impact.

7.6 MITIGATION MEASURES

The development includes for the following landscape and visual mitigation as part of the proposed design:

- 2m (high) x 6m (wide) boundary earth berms as visual screening,
- Grass planting of boundary earth berms,
- Earth berms planted with a double line of hawthorn whips at 1m spacing,
- Supplemental planting of any gaps in existing hedgerows.

The following mitigation measures have been proposed as part of this assessment:

- It is recommended that inactive overburden stockpiles are planted with grass in order to mitigate these as a visual feature.

Additional visual mitigation which should be considered for the existing infrastructure and operations are as follows:

- Any new or replacement buildings or tanks should be composed of cladding with a dark, or optimally dark green finish.
- Stone and overburden stockpiles should be located within the 64m AOD lower working area and below the height of the boundary earth berms, where operational space allows.
- Additional planting should be considered along the northern boundary and site access road to screen existing structures.

7.7 REFERENCES

Environmental Protection Agency (2017) Draft. Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Environmental Protection Agency (2003) Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements).

Environmental Protection Agency (2002) Guidelines on the information to be contained in an Environmental Impact Statement.

Cork County Development Plan 2022-2028. Available at: https://www.corkcoco.ie/en/resident/planning-and-development/cork-county-development-plan-2022-2028

Cork CDP Map Browser. Available at: https://corkcoco.maps.arcgis.com/apps/webappviewer/index.html?id=0998608db8dd4fa2b7dfeb2e5ec808ce

Cork County Draft Landscape Strategy (2007). Available at: http://corkcocoplans.ie/wp-content/uploads/bsk-pdf-manager/2016/07/Draft-Landscape-Strategy-2007.pdf

SECTION B - THE NATURAL ENVIRONMENT

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed development on the natural environment. The effects have been grouped as follows:

Impacts on Biodiversity – Terrestrial & Aquatic Environment
Impacts on Land – Soils, Geology, Hydrology and Hydrogeology

The various aspects of the natural environment interact to some degree with each other so that assessing one aspect in isolation can be misleading. For example, the survival of terrestrial fauna can be dependent on floral composition, which is in turn dependent on soil composition and groundwater levels. Similarly, the diversity of aquatic flora and fauna would be impacted by both hydrology and the quality of waters receiving drainage from the proposed scheme.

Human Beings also interact with the natural environment, often by altering land-use and landscape patters for the purpose of agriculture and settlement.

8.0 BIODIVERSITY – TERRESTRIAL & AQUATIC ENVIRONMENT

8.1 INTRODUCTION

This chapter describes the likely significant effects of the proposed development on biodiversity, including flora (plants), fauna (animals), and habitats in both the terrestrial and aquatic environment. Mitigation measures are also described, where applicable or appropriate, that avoid or minimise adverse biodiversity effects.

Chapter 2 Description of The Proposed Development provides a full description of the proposed development. An Appropriate Assessment (AA) Screening has also been prepared for the project, and these will be submitted to Cork County Council as part of the planning application documentation.

The potential effects on biodiversity in this chapter should be considered in conjunction with the other chapters of the EIAR including Chapter 2 Description of The Proposed Development, Chapter 3 Alternatives, Chapter 5 Air Quality, Climate and Odour, Chapter 6 Noise Environment, Chapter 9 Land - Soils, Geology, Hydrology & Hydrogeology, Chapter 11 Material Assets – Natural & Other Resources, Chapter 12 Material Assets – Utilities & Traffic and Chapter 13 Interactions and Inter-Relationships.

This report was prepared by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ornithology).

8.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY

8.2.1 LEGISLATIVE CONTEXT

Flora and fauna in Ireland are protected at a national level by the Wildlife Act 1976, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC).

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats.
The relevant categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to meet the EU Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) are designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC; and
- Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act 2000. A NHA is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated.

Relevant European Legislation:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (The Birds Directive);
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (The Water Framework Directive);
- Directive 2006/44/EC of the European Parliament and of the Council of 6 September 2006 on the quality of fresh waters needing protection or improvement in order to support fish life (The Fish Directive (consolidated)).

Relevant Irish Legislation

- The Wildlife Act 1976, as amended by the Wildlife Act 1976 (Protection of Wild Animals) Regulations, 1980, the Wildlife (Amendment) Act 2000, the Wildlife (Amendment) Act 2010, Wildlife (Amendment) Act 2012, European Communities (Wildlife Act, 1976) (Amendment) Regulations 2017. (The Wildlife Act);
- European Communities (Conservation of Wild Birds) Regulations 1985 (S.I. 291/1985) as amended by S.I. 31/1995;
- European Communities (Natural Habitats) Regulations, S.I. 94/1997 as amended by S.I. 233/1998 & S.I. 378/2005 (The Habitats Regulations);
- Fisheries (Consolidation) Act, 1959 (as amended), hereafter referred to as the Fisheries Act;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011);
- The Flora (Protection) Order, 2015 (S.I. No. 356/2015).

8.3 METHODOLOGY

8.3.1 RELEVANT GUIDELINES

This chapter of the EIAR follows the Environmental Protection Agency's *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2022). It also takes account of the *draft Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Environment, Community and Local Government, August 2018), *Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition (*Chartered Institute of Ecology and Environmental Management CIEEM 2016) and *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1* (CIEEM, 2018).

Reference was also made to the following documents where relevant:

- *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)* (European Union (EU), 2017);
- *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC* (EC Environment Directorate-General, 2018);
- *Guidance on integrating climate changes and biodiversity into environmental impact assessment* (EU Commission 2013);
- *Assessment of plans & projects in relation to N2K sites – Methodological Guidance* (EC 2021);
- *Guidance document on the strict protection of animal species of Community interest under the Habitats Directive* (EC 2021);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority* (NRA) 2009);
- *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011);
- *A Guide to Habitats in Ireland* (Fossitt, 2000);
- *Guidelines for the treatment of Badgers prior to the construction of National Road Schemes. National Roads Authority, Dublin* (National Roads Authority (NRA) 2005a);
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (National Roads Authority (NRA) 2005b).
- *Guidelines for the treatment of bats during the construction of national road schemes* (National Roads Authority (NRA) 2005c);
- *Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes*. (National Roads Authority (NRA) 2006).
- *Guidelines for the treatment of Otters prior to the construction of National Road Schemes* (National Roads Authority (NRA) 2008);
- *Bird Census Techniques* Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000)
- *Bird Monitoring Methods - a Manual of Techniques for Key UK Species*. Gilbert, G., Gibbons, D.W. & Evans, J. (1998) and
- *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed)' (Collins, 2016)

8.3.2 STUDY AREA / ZONE OF INFLUENCE

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors and aquatic environments. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur. The zone of influence also takes into consideration the watercourses surrounding the proposed development.

Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary for habitats, to buffers of 150m for specific species e.g. Otter. However, it should be noted that these buffers were extended where required.

8.3.3 GENERAL

The biodiversity assessment addresses the potential likely significant direct, indirect and cumulative effects of the proposed development on terrestrial and aquatic biodiversity, including flora, fauna, and habitats in proximity to the site. The assessment has been carried out in three stages:

1. Desktop assessment to determine existing information and records in relation to:

    - Sites, species, and habitats protected under Council Directive 92/43/EEC (Habitats Directive), and sites and species protected under Council Directive 2009/147/EC (Birds Directive), within the zone of influence of the proposed development and more distant hydrologically linked sites.

    - Biodiversity, habitats, and species present near the proposed development.

2. Site visits and field surveys by the specialist ecologists to establish the existing ecological conditions within the footprint of the proposed development and within the vicinity of all the proposed development elements.

3. Evaluation of the proposed development and determination of the scale and extent of potential likely direct and indirect significant effects on biodiversity (i.e., flora, fauna, and habitats) and the identification of appropriate mitigation and monitoring which may be required.

8.3.4 CONSULTATION

The consultation process which informed the scope of this EIAR is described in **Chapter 1** Introduction. No specific comments or guidance with regard to biodiversity were provided during the consultation process for the scheme as proposed.

8.3.5 DESKTOP STUDY

A desktop study was carried out to collate the available information on the local ecological environment. The purpose of the desktop study was to identify features of ecological value occurring within the proposed development site and those occurring near to it which have the potential to be affected by the proposed development. A desktop review also allows the key ecological issues to be identified early in the assessment process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks and Wildlife Service (NPWS) - www.npws.ie;
- Environmental Protection Agency (EPA) – www.epa.ie;
- National Biodiversity Data Centre (NBDC) – www.biodiversityireland.ie;
- Bat Conservation Ireland - www.batconservationireland.org;
- Birdwatch Ireland - www.birdwatchireland.ie;
- National Biodiversity Action Plan 2017-2021 (NPWS 2017) and
- Cork County Development Plan 2022-2028 (Cork County Council 2022).

8.3.6 SITE SURVEYS

A site walkover survey was carried out on the 8th June 2022, 10th June 2022, 6th April 2023, 26th April 2023 to identify the habitats, flora and fauna present at the site. The survey area included all lands within the proposed development site boundary as outlined in Attachment 2.2 of this EIAR.

The following surveys were carried out:

- Habitats were mapped according to the classification scheme outlined in the Heritage Council Publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). Habitats were cross referenced with Habitats Directive Annex I habitats. Invasive species were also recorded.
- During these surveys, the site was also surveyed for invasive species and rare floral species (Wyse *et al.*, 2016; Stace 2019).
- A general bird survey based on the British Trust for Ornithology (BTO) Common Bird Census (CBC) methodology and Breeding Bird Survey (BBS) (Gilbert *et al.* 1998 and Bibby *et al.* 2000) was carried out within the survey area. The survey focused on terrestrial habitats within the planning boundary. The site was walked so that all habitats within 50m of all potential nesting features were surveyed. The ornithological surveyor slowly walked through the site, stopping at regular intervals to scan with binoculars and to listen for bird calls or song. Birds were identified by sight and song. All species seen or heard in the survey area and immediate environs were recorded including those in flight.
- A general mammal survey was conducted in conjunction with habitat survey. This survey focused on protected mammal species (Wildlife Act 1976, as amended) in particular on Badger *Meles meles* and Otter *Lutra lutra* and identifying potential habitat for bats (NRA 2005a, NRA 2005b, NRA 2005c, NRA 2008). Field signs of Badger are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous Badger paths, footprints, small excavated pits or latrines in which droppings

are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where Badgers have searched for insects and plant tubers. Trail camera surveys were based on Scottish Natural Heritage methods (SNH 2018). Otter survey methodology followed guidance outlined in NRA (2008) and included searches for breeding or resting sites within 150m of the proposed development site boundary. Other evidence of Otter, including spraints, footprints, or feeding remains, was also recorded where present.

Site visits and surveys were carried out in accordance with best practice and in the expert opinion of the authors, are considered sufficient to assess potential significant ecological effects associated with the project. The standard literature was checked for reference to the site and locality, as were the listings of sites of conservation importance in the Killdorrery area held by the NPWS of the Department of the Environment, Heritage and Local Government (www.npws.ie).

8.4 DESCRIPTION OF EXISTING ENVIRONMENT

8.4.1 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The existing quarry is located in the townland of Carrigdownane Upper, Rockmills, Killdorrery, Co. Cork. The site is located approximately 1.2 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively. The site is accessed via a private entrance and c.540m road from the L5612. The quarry extraction area boundary is located approximately 420m from the L5612 road. Goods vehicles accessing and exiting the site use the L5612 to connect to the R512, connecting Killdorrery to Glanworth through Rockmills village.

The total extension area would be 4.21 ha, with an extraction area of 3.84 ha. The existing quarry area is 4.718 ha (not including entrance road). Limestone will be extracted through blasting, crushing and screening before being loaded onto trucks for use primarily in the agricultural industry. The extraction will remain above the water table.

The site is surrounded by lands, which are primarily used for agricultural activities. The quarry is flanked by an industrial facility to the south. There are a number of domestic residences in the vicinity of the site located mainly along the public roads; comprising one-off rural dwellings and some with associated with farm holdings. The closest occupied dwelling house to the quarry is approximately 450 m from the north-eastern boundary of the quarry.

8.4.2 DESIGNATED SITES

8.4.2.1 European Sites

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

In accordance with the European Commission Methodological Guidance (EC 2018), a list of Natura 2000 Sites that can be potentially affected by the proposed project has been compiled.

All SACs, candidate SACs (cSAC) and SPAs sites which could potentially be impacted by the proposed development have been identified. Table 8.1 lists the relevant Natura 2000 sites, the location of which are shown in Figure 8.1.

The proposed development is not located within a Natura 2000 site. The nearest Natura 2000 site to the quarry is the Blackwater River (Cork/Waterford) SAC. Although the proposed development site is located approximately 4km east of the SAC at its closest point, the closest point by hydrological connectivity to the Blackwater River (Cork/Waterford) SAC is approximately 17.7km to the southeast, near Fermoy via the River Funshion. This is also the connection to the Blackwaters Callows SPA. The River Funshion is a tributary of the River Blackwater but it not included within the boundary of the Blackwater River (Cork/Waterford) SAC or the Blackwaters Callows SPA. There are no hydrological or other connections between the Carrigeenamronety Hill SAC and Ballyhoura Mountains SAC and the proposed development site.

The River Blackwater is one of the largest rivers in Ireland, draining a major part of County Cork and parts of Counties Kerry, Limerick, Tipperary and Waterford. The Blackwater River (Cork/Waterford) SAC consists of most of the freshwater stretches of the system as well as the estuarine component at Youghal. Tidal influence extends almost to Cappoquin. The site supports important examples of a range of Annex I habitats, notably estuaries, intertidal mudflats and sandflats, perennial vegetation of stony banks, salt meadows, floating river vegetation, alluvial forests and oak woodlands. Most of these are of good quality and extensive in area. The Blackwater system is an important salmonid fishery and is of high conservation value for *Salmo salar*. Also supports important populations of *Lampetra planeri*, *L. fluviatilis*, *Petromyzon marinus* and *Alosa fallax fallax*. Substantial populations of *Margaritifera margaritifera* occur, while *Austropotamobius pallipes* is found in the Awbeg River. *Lutra lutra* is widespread throughout the site and has been subject to detailed surveys. *Trichomanes speciosum* occurs at one location.

The Blackwater Callows SPA comprises a 23 km stretch of the River Blackwater, running in a west to east direction between Fermoy and Lismore. It includes the river channel and strips of seasonally flooded grassland within the flood plain. The site is of high importance for wintering waterfowl. It supports an internationally important population of *Cygnus cygnus* and nationally important populations of *Anas penelope*, *Anas crecca* and *Limosa limosa*. The population of *Limosa limosa* has exceeded the threshold for international importance at times. Formerly it had a regular population of *Cygnus columbarius bewickii* but this no longer occurs, reflecting a contraction of range at a national level. *Egretta garzetta* breeds locally and this species is now a regular visitor to the site. The Blackwater system is an important salmonid fishery and is of high conservation value for *Salmo salar*. It also supports important populations of *Lampetra planeri*, *L. fluviatilis*, *Petromyzon marinus* and *Alosa fallax fallax*. *Lutra lutra* is widespread throughout the site.

Potential impacts on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in the Report in Support of Appropriate Assessment (AA) screening which has been submitted as part of this application.

Table 8.1: Designated sites and their location relative to the proposed works area.

Natura 2000 sites within the Zone of Influence (ZoI)	**Code**	**Distance at the closest point (as the crow flies)**	**Qualifying Interests/Special Conservation Interests**
Special Area of Conservation (SAC)			
Blackwater River (Cork/Waterford) SAC	002170	4.0km west	Habitats 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1220 Perennial vegetation of stony banks 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 1410 Mediterranean salt meadows (Juncetalia maritimi) 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* Species 1421 Killarney Fern *(Trichomanes speciosum)* 1103 Twaite Shad *(Alosa fallax fallax)* 1099 River Lamprey *(Lampetra fluviatilis)* 1096 Brook Lamprey *(Lampetra planeri)* 1095 Sea Lamprey *(Petromyzon marinus)* 1106 Salmon *(Salmo salar)* 1092 White-clawed Crayfish *(Austropotamobius pallipes)* 1029 Freshwater Pearl Mussel *(Margaritifera margaritifera)* 1355 Otter *(Lutra lutra)*

Natura 2000 sites within the Zone of Influence (ZoI)	Code	Distance at the closest point (as the crow flies)	Qualifying Interests/Special Conservation Interests
Carrigeenamronety Hill SAC	002037	8.7km north	**Habitats** 4030 European dry heaths **Species** 1421 Killarney Fern *(Trichomanes speciosum)*
Ballyhoura Mountains SAC	002036	9.1km north	**Habitats** 4010 Northern Atlantic wet heaths with Erica tetralix 4030 European dry heaths 7130 Blanket bogs (* if active bog)
Special Protection Area (SPA)			
Blackwater Callows SPA	004094	12.4 km southeast	**Birds** A050 Wigeon *(Anas penelope)* A052 Teal *(Anas crecca)* A038 Whooper Swan *(Cygnus cygnus)* A156 Black-tailed Godwit *(Limosa limosa)* **Habitats** Wetlands
Kilcolman Bog SPA	004095	14.2km northwest	**Birds** A052 Teal *(Anas crecca)* A038 Whooper Swan *(Cygnus cygnus)* A056 Shoveler *(Anas clypeata)* **Habitats** Wetlands

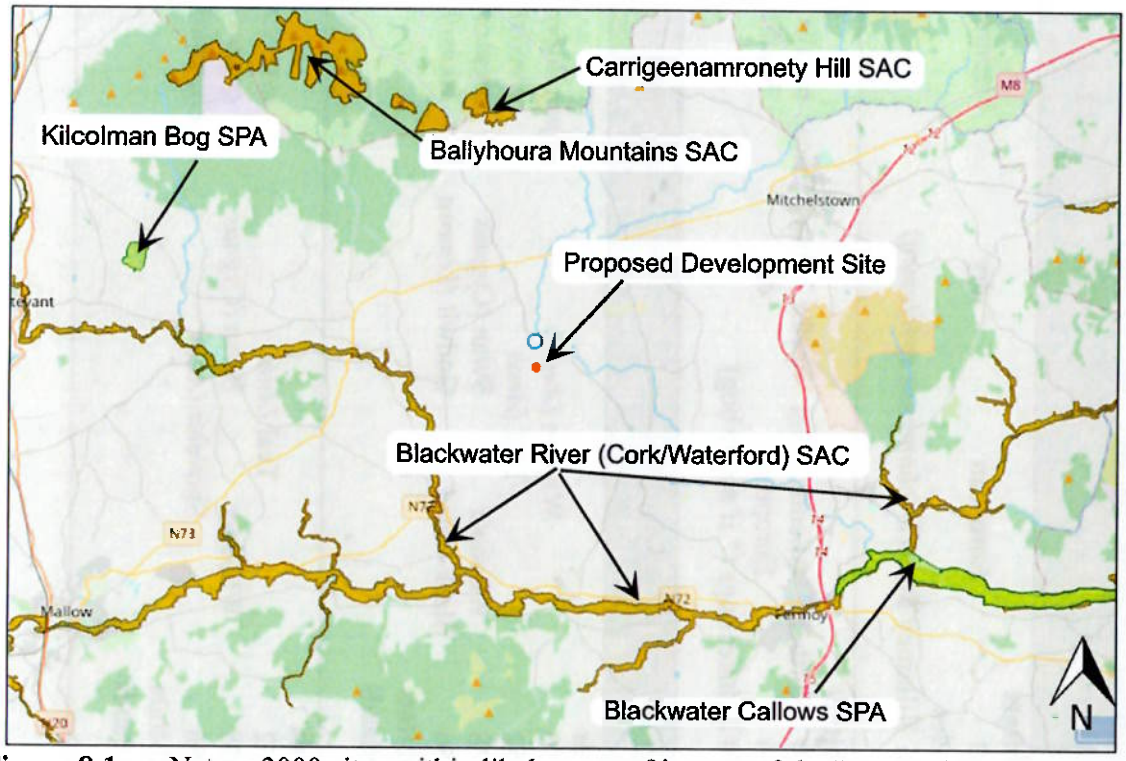

Figure 8.1: Natura 2000 sites within likely zone of impact of the Proposed Development | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | not to scale

8.4.2.2 National Sites

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. These areas are considered nationally important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.
Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are also of significance for wildlife and habitats. Prior to statutory designation, pNHAs are still subject to limited protection, in the form of:

- Agri-environmental farm planning schemes support the objective of maintaining and enhancing the conservation status of pNHAs;
- There is a requirement for the Forest Service to gain NPWS approval before they will pay afforestation grants on pNHA lands; and,
- A recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

The NHAs (pNHAs) located in the vicinity of the proposed development site are listed in **Table 8.2** and are shown in **Figure 8.2**.

While the proposed development site is located in proximity to a number of pNHAs (See **Table 8.2**), As discussed in **section 8.4.2.1** of this EIAR, the surface water and groundwaters

flow for the site is to the northeast, towards the River Funshion, pNHAs associated with the Blackwater River (Cork/Waterford) SAC are located upstream of the proposed development site. Other NHAs/pNHAs are not hydrologically connected to the proposed development site. Given the above, no viable pathway exists between the proposed development site and any NHA/pNHA.

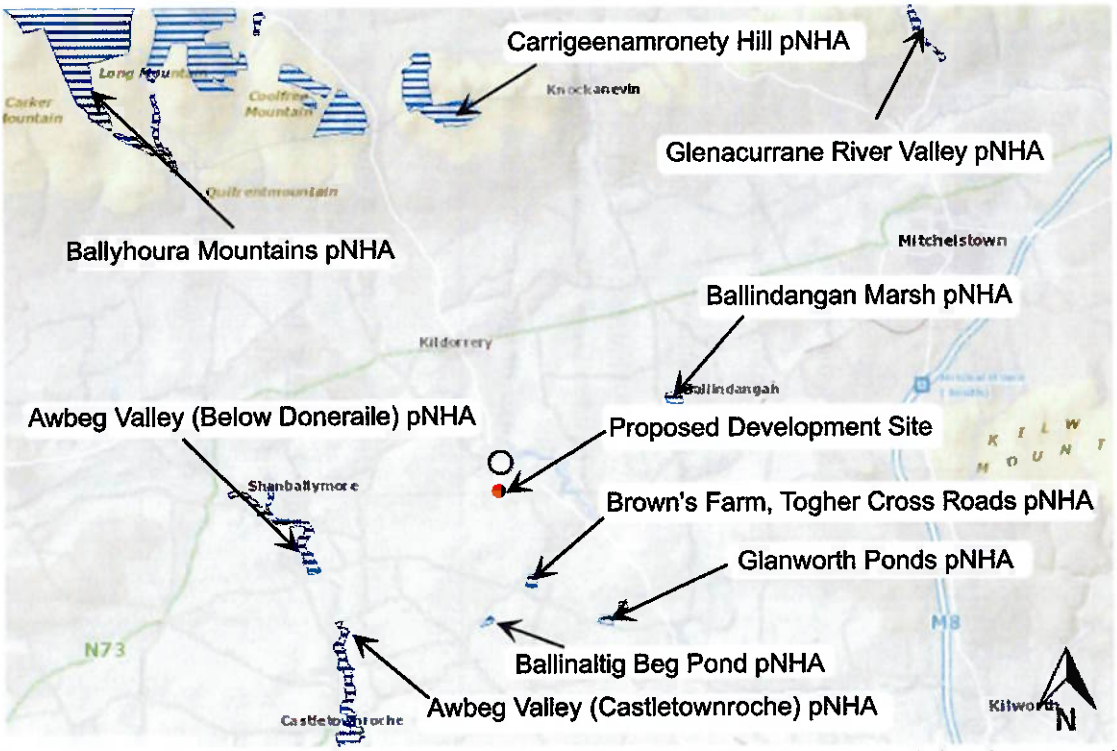

Figure 8.2: Natural Heritage Areas (NHA) in the vicinity of the proposed development site | Source EPA envision mapping | Not to scale

Table 8.2: NHA and pNHA Sites in the vicinity of the proposed development site

SITE NAME	SITE CODE	OVERLAPPING WITH EUROPEAN SITE	DISTANCE TO PROPOSED DEVELOPMENT
Brown's Farm, Togher Cross Roads pNHA	001169	No	1.0km south Recorded as supporting protected plant - Golden Dock (*Rumex maritimus*). No hydrological or other connection. No viable pathway exists.
Glanworth Ponds pNHA	000085	No	2.8km southeast Wetland habitat. Recorded as supporting protected plant - Golden Dock (*Rumex maritimus)* No hydrological or other connection. No viable pathway exists.
Ballinaltig Beg Pond pNHA	001829	No	1.9km south This site comprises a small pond within an area of agricultural grassland. The site has been recorded as supporting protected plant - Golden Dock (Rumex maritimus). No hydrological or other connection. No viable pathway exists.

SITE NAME	SITE CODE	OVERLAPPING WITH EUROPEAN SITE	DISTANCE TO PROPOSED DEVELOPMENT
Ballindangan Marsh pNHA	000899	No	4.4km northeast Wetland habitat. Recorded as supporting orotected plant - Golden Dock (*Rumex maritimus*). No hydrological or other connection. No viable pathway exists.
Awbeg Valley Below Doneraile	000074	Blackwater River (Cork/Waterford) SAC (2170)	3.4km southwest Freshwater and wooded site. Important river for the White-clawed Crayfish (Austropotamobius pallipes). The site contains semi-natural woodland and the relatively rare Toothwort (Lathraea squamaria), Com- mon Calamint (Calamintha ascendens), Red Campion, Sand Leek (Alli- um scorodoprasum) and Wood Club- rush (Scirpus sylvaticus) Other important habitats and species include: • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation • Otter (*Lutra lutra*) • Kingfisher (*Alcedo atthis*) • Brook Lamprey (*Lampetra planeri*) • River Lamprey (*Lampetra fluviatilis*) No hydrological or other connection. No viable pathway exists.

SITE NAME	SITE CODE	OVERLAPPING WITH EUROPEAN SITE	DISTANCE TO PROPOSED DEVELOPMENT
Awbeg Valley (Castletownroche)	001561	Blackwater River (Cork/Waterford) SAC (2170)	4.5km southwest This site incorporates a 3km stretch of the Awbeg River and includes an area of dry broad-leaved woodland with an interesting plant community. No hydrological or other connection. No viable pathway exists.
Carrigeenamronety Hill pNHA	002037	No	8.7km north. The site is on eastern edge Ballyhoura mountains which straddles the border of counties Cork and Limerick. It is important site because it contains a good population of the rare and protected Killarney Fern, a species listed on Annex II of the E.U. Habitats Directive. No hydrological or other connection. No viable pathway exists.
Ballyhoura Mountains pNHA	002036	No	9.1km north This site consists of wet heath occurring in mosaic with blanket bog and dry heath. These three habitats are Annex I habitat under the EU Habitats Directive. No hydrological or other connection. No viable pathway exists.
Glenacurrane River Valley pNHA	002035	No	9.2km northeast No hydrological or other connection. No viable pathway exists.

8.4.3 FLORA & HABITATS

8.4.3.1 Habitats

Site surveys were carried out on the 8th June 2022, 10th June 2022, 6th April 2023, 26th April 2023. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within or adjacent to the proposed development site was classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.

A current overview of habitats recorded within the site is shown in Figure 8.3 and the habitats recorded on site are described in **Table 8.3**. Photographs of the site are included in **Attachment 8.2**. The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Attachment 8.1**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value).

The proposed development would allow the facility to continue the current quarrying operation at this site. The extension area will be located within agricultural land to the west and southwest of the existing quarry. The proposed development would be a continuation of the current quarrying activity and there will be no intensification of the existing operations. The existing quarry is dominated by highly disturbed habitats with some planted trees along external boundaries. Natural or semi-natural vegetation is largely absent with the exception of common ruderal species. The proposed extension area is dominated by improved pasture for cattle with limited species diversity. Field boundaries consist primarily of hedgerows with sections of mature treeline. There are no watercourses or waterbodies within or in close proximity to the proposed development site. No Annex I habitats were recorded within the existing quarry or proposed development site.

Table 8.3: Habitat present and their relative value.

Habitat	Comments	Ecological value (NRA guidelines)
Improved agricultural grassland (GA1)	The dominant habitat within the proposed development area are one large field of improved agricultural grassland on level ground. This area has not recently been grazed or cut with dense growth of low diversity grassland. Perennial Rye Grass is the dominant grass species with Yorkshire Fog, Cocksfoot and Smooth Meadow Grass also recorded. Herbaceous species noted included Mayflower, Field Sorrel, Curled Dock, Hogweed, Common Mouse Ear, Red Clover, Field Thistle, Creeping Buttercup, Ragweed and Dandelion. These are all common constituents of this type of managed agricultural grassland. The second large field has a short sward and less biodiversity. Species noted include This is not an Annex I habitat and is not a qualifying interest for the Blackwater River (Cork/Waterford) SAC	Local importance (Lower value)
Earthbank (BL2)/Improved agricultural grassland (GA1)/Dry meadows and grassy verges (GS2)	A berm forms the western boundary of the existing quarry. It is dominated by common grass species and is similar in species composition to the adjoining improved agricultural grassland. Grass species include Perennial Rye Grass and Yorkshire Fog. Herbaceous species include Bramble, Hogweed and Field Thistle. Trees have been planted along the berm On the northern boundary of the existing quarry, where the berm is wider and the soil is less fertile, this forms a mosaic of Improved agricultural grassland (GA1)/Dry meadows and grassy verges (GS2). Species recorded in this area include Cocksfoot, Yorkshire Fog, Creeping Buttercup, Clovers, Speedwell, Ragweed, Primrose, Nettle, False Oat grass, Field Thistle and Buddleia. Some immature Sycamore have begun to recolonise this area. GS2 has links with Annex I habitat i.e. Corresponds to the annexed habitat, 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. However, the grassland mosaic within the proposed development site does not correspond to this Annex I habitat. This is not an Annex I habitat and is not a qualifying interest for the Blackwater River (Cork/Waterford) SAC.	Local importance (Lower value)

Habitat	Comments	Ecological value (NRA guidelines)
Hedgerows (WL1)/ Treelines (WL2)	Boundary habitats consist primarily of good quality hedgerows with occasional mature trees and treelines. A review of historical mapping (Ref: www.osi.ie) indicates that some internal boundaries that were present in the 1800s were no longer present by 1995. However, the external boundaries have remained broadly similar. Hedgerows within the site support a high proportion of native species particularly Elder, Hawthorn, Blackthorn and Bramble. Gorse and Bracken also occur but are more limited in extent. Climbing plants such as Dog Rose and Honeysuckle have a patchy distribution. Fertiliser drift and heavy shade has reduced diversity in the ground layer and in the grassy verge alongside the hedge. Species noted include Cow Parsley, Hogweed, Male Fern, Ladies Fern, Herb Robert, Lesser Celendine, , Hartstongue Fern, Lesser Dog Greater Stichwort, Gemander Speedwell, Goosegrass, Nettle and Yorkshire Fog. Apart from small sections of distinct treeline, large trees are limited in extent with a small number of larger individual Sycamore noted. The largest section of distinct treeline (A-B on Figure 8.3) is dominated by 12 semi-mature Sycamore and one semi-mature Ash. A smaller treeline of 5 semi-mature ash (C-D on Figure 8.3) is located along the southern boundary of the agricultural field. Several of these trees are showing symptoms of Ash die back disease and these trees are unlikely to survive in the absence of development. A small section of treeline runs along the eastern boundary of the exiting quarry. The short section of treeline is dominated by Ash with relatively dense ivy. Hedgerow species include Nettle, Hawthorn, immature Sycamore, Wild Rose, Blackthorn and Elder The semi mature/mature trees have some ivy covering, and the presence of occasional roosting bats cannot be entirely precluded but they are not of significant value as potential bat roosts. The hedgerows along the site boundaries are generally well maintained and this regular trimming keeps the	Local importance (Higher value)

Habitat	Comments	Ecological value (NRA guidelines)
	hedges dense. This improves the structure of these hedges for breeding birds. The height of the hedges varies considerably. Some open sections are dominated by grasses and low growing bramble but these areas are limited in extent. The mixture of hedges/treelines occurring within the site is of local value for wildlife. These mature, native hedgerows can provide important habitats for local wildlife such as birds, insects, mammals and commuting routes and nesting habitat. Nearly two thirds of Ireland's bird species nest in hedges. The berries of the spinose species recorded are particularly important as a source of winter food to both migratory species and resident species. Bats also like to roost in old, hollow hedgerow trees and hunt for insects along the hedge itself. Hundreds of different species of invertebrates have found their niches on the leaves, twigs and bark of hedgerow shrubs. In general, mature, native and well managed hedgerows with a broad diversity of plant species are the most beneficial to wildlife. This is not an Annex I habitat and is not a qualifying interest for the Blackwater River (Cork/Waterford) SAC	
Buildings and artificial surfaces (BL3)	A surfaced track provides access to the active quarry from the local road L5612.	Local importance (Lower value)
Active quarries and mines (ED4)	The existing active quarry includes the active faces, access tracks and stockpiled materials. Generally these habitats are of minimal ecological value, however areas of cliff and stockpiles support Sand Martin colonies (see Section 8.4.3.10 for details). It is noted that there is no dewatering required onsite, as all extraction takes place at least 1 metre above the water table. Therefore, there are no drains/lagoons within the active quarry. This habitat does not correspond to an Annex I habitat	Local importance (Lower value)

Figure 8.3: Habitats recorded within proposed development site boundary

8.4.3.2 Flora

The proposed development area lies within Ordnance Survey National Grid 10km square (hectad) R70. The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10km squares. **Table 8.4** lists threatened species, designations and 10km hectad.

The NBDC database lists one threated plant species within R70 i.e., Golden Dock (*Rumex maritimus*). This species is not included in the Flora (Protection) Order, 2022 (S.I. No. 235/2022). Golden Dock is very rare in Ireland but has been recorded from County Cork, Ireland, from about 1870. This species frequently grows in areas that flood with water. No signs of this species were recorded at the proposed development site.

No rare or protected plant species were recorded during the site survey and given the current maintenance regime/intensive farming practices, are unlikely to occur.

Table 8.4: NBDC listed flowering and endangered flowering plants for hectad N81

Hectad	Flowering plant Species	Latin Name	Designations/Status
R70	Golden Dock	Rumex maritimus	Threatened Vulnerable

Source NBDC database 20/06/22

8.4.3.3 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of both aquatic and terrestrial high impact invasive plant species which have been recorded within hectad R70 (**Table 8.5**). It should be noted that this data relates to the entire 10km^2 area and these species will not necessarily occur within the proposed development site boundary.

Table 8.5: NBDC records of high impact invasive species from R70

Species Group	Species Name
Flowering plant	Canadian Waterweed (*Elodea canadensis*)
Flowering plant	Cherry Laurel (*Prunus laurocerasus*)
Flowering plant	Curly Waterweed (*Lagarosiphon major*)
Flowering plant	Fringed Water-lily (*Nymphoides peltata*)
Flowering plant	Giant Hogweed (*Heracleum mantegazzianum*)
Flowering plant	Indian Balsam (*Impatiens glandulifera*)
Flowering plant	Japanese Knotweed (*Fallopia japonica*)
Terrestrial mammal	American Mink (*Mustela vison*)
Terrestrial mammal	Fallow Deer (*Dama dama*)

Source: NBDC 20/06/22

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that:

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof'][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed Fallopia japonica, as follows: "any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [....] shall be guilty of an offence."

No third schedule invasive species or species which are at risk of having damaging effects (Kelly *et al.* 2013), were recorded within the proposed development site. The non-native invasive species Buddleia was recorded along the grassy berms on the northern boundary of the existing quarry. This species is not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, its presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011). However, Buddleia is classified as an Amber Threat species by Invasive Species Ireland and a medium impact species by the NBDC, which under the right ecological conditions may have a negative impact on native species or habitats.

8.4.4 FAUNA

8.4.4.1 Bats

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The Lesser Horseshoe Bat Rhinolophus hipposideros is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: Common Pipistrellus pipistrellus, Soprano Pipistrellus pygmaeus and Nathusius' Pipistrellus nathusii, four Myotids: Natterer's Myotis nattereri, Daubenton's *Myotis daubentonii*, Whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, the Brown Long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Whiskered and Natterer's bats are listed as 'Threatened in Ireland', while the other species are listed as 'Internationally Important' in the Irish Red Data Book 2: Vertebrates (Whilde, 1993). The population status of both Whiskered and Natterer's Bats was considered 'indeterminate' because of the small numbers known of each, a few hundred and approximately a thousand respectively. Ireland is considered to be an international stronghold for Leisler's Bat, whose global status is described as being at 'low risk, near threatened' (LR; nt) by the IUCN (Hutson, *et al.*, 2001).

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because the species has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990s to present.

All bat species are protected under the Wildlife Act 1976, as amended, which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure, or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

All bats are listed on Annex IV of the EU Habitats Directive. The domestic legislation that implements this Directive gives strict protection to individual bats and their breeding and resting places. It should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate under the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law) issued by NPWS.

The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order, in relation to the planning and development regulations, such licences should be obtained, are set out in Circular

Letter NPWS 2/07 "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences*" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007.

Table 8.6 summarises the protection given to bats by national and international legislation and conventions.

Table 8.6: Legislative protection for bats in Ireland

Legislation/Convention	Relevance to Irish bats
The Wildlife Act 1976, as amended	It is an offence to wilfully interfere with or destroy the breeding or resting place of bats, (with some exemptions for certain kinds of construction development). Provides for the creation of NHAs.
EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC), commonly known as the 'Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011	Lists all the vesper bats in Annex IV as in need of strict protection and also encourages Member States to conserve landscape features such as river corridors, field boundaries, ponds, and woodlands. It also requests that Member States establish a system to monitor the incidental capture and killing of the animals listed in Annex IV. The lesser horseshoe bat is further listed in Annex II of the EU Habitats Directive The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation.
The Convention on the Conservation of European Wildlife and Natural Habitats, commonly known as the 'Berne Convention'.	It obliges states to protect and conserve animals and their habitats, especially those listed as endangered or vulnerable. Also obliges parties to promote national policies for the conservation of wild fauna and natural habitats
The Convention on the Conservation of Migratory Species of Wild Animals, commonly known as the 'Bonn Convention'.	This led to the European Bats Agreement (EUROBATS), which lists a wide range of objectives, including promoting research programmes relating to the conservation and management of bats, promoting bat conservation and public awareness of bats, and identifying and protecting important feeding areas of bats from damage and disturbance.

A review of existing bat records within the hectad of the planning boundary (Source NBDC) indicates that no bat species have been recorded within R70 (**Table 8.7**).

Table 8.7: Presence of Irish bat species within hectad R70

Common name	Scientific name	Presence
Lesser Noctule	*Nyctalus leisleri*	Absent
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Absent
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Absent
Daubenton's Bat	*Myotis daubentoniid*	Absent

Common name	Scientific name	Presence
Natterer's Bat	*Myotis nattereri*	Absent
Brown Long-eared Bat	*Plecotus auratus*	Absent
Whiskered Bat	*Myotis mystacinus*	Absent
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Absent

Source NBDC 20/06/22

However, bat species not recorded in the NDBC database could potentially occur in the vicinity of the proposed development site. A study by Lundy *et al.* (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur. Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The habitat indices for all Irish bats for the landscape within the vicinity of the proposed development site at the proposed development site is shown in Table 8.7. Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared Bat are widespread in the Irish countryside and are likely to occur in the vicinity of the proposed development. Leisler's Bat could also potentially forage around the site. There are no records of Lesser Horseshoe Bat within 20km of the proposed development site.

Table 8.8: Model Predicted Habitat suitability indices for All Irish bat species at the study area

Latin Name	Common Name	Habitat indices
All Bats		24.44
Pipistrellus pygmaeus	Soprano pipistrelle	37
Plecotus auratus	Brown long-eared bat	38
Pipistrellus pipistrellus	Common pipistrelle	36
Rhinolophus hipposideros	Lesser horseshoe	0
Nyctalus leisleri	Leisler's bat	37
Myotis mystacinus	Whiskered bat	22
Myotis daubentoniid	Daubenton's bat	5
Pipistrellus nathusii	Nathusius' pipistrelle	30
Myotis nattereri	Natterer's bat	29

Source: NBDC 14/02/22

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Potential roost features associated with trees include cracks, crevices, loose bark, woodpecker holes and splits. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Bats generally make use of large mature trees that contain natural holes, cracks/splits in major limbs, loose bark, hollows/cavities, dense epicormic growth (bats may roost within it) and bird and bat boxes. The importance of trees to bats varies with species, season and foraging behaviour. For Leisler's bats, trees are essential for both summer and winter roosts while Daubenton's and Natterer's bats utilise trees more often during the summer months. Other species such as brown long-eared bats and pipistrelle bats avail of trees in the winter months. In general, individual males throughout the season use tree roosts, more often, while females will use trees for temporary night roosts or night perches for consuming prey. Hollow trees are widely used by bats for both summer and winter roosts (weather dependent) and bats will roost in 'sound' trees in crevices, holes and under split bark. Bats rest, give birth, raise young and hibernate in tree holes, crevices and beneath loose bark. Species of trees utilised by bats include oak, ash, beech and Scots pine. Trees, especially native ones also play host to numerous insect species which are prey items for bat species. Trees also provide shelter for swarming insects which bats will avail of. In addition, trees are important commuting routes for bats.

The grassland and activity quarry which dominate the proposed development site provide low value foraging habitat for bats. There are no building at the site which could potentially support bat roosts. Although some of the trees within the hedgerow and treelines of the extension area are relatively mature, there are no over mature trees which are likely to provide significant roosting habitats for bats. It is noted that the proposed extension area provides potential foraging areas for bats along native hedgerows/treelines (See **Figure 8.3**). There are no bat foraging habitats within the existing quarry. Overall, the proposed development site is of low local value for foraging bats.

8.4.4.2 Otter

Otter *Lutra lutra*, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive which is transposed into Irish law in the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I 477 of 2011), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe, they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints, and remains of prey items.

Spraints are of value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting places or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable, the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called "couches" are formed. (NRA, 2008). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season. It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City.

Otter have been recorded on three occasions in R70, the most recent in September 2013 (Source NBDC 03/05/23). The River Funshion is located approximately 1.2km northeast of the proposed development site. Otter have been recorded on this river downstream of the site. There are no watercourses or wetland habitats within the proposed extension area or existing quarry which could provide foraging habitat for Otter. No signs of Otter were recorded within 150m of the proposed development site. The proposed development site is of low local value for Otter.

8.4.4.3 Badger

Badger and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage a protected species. Badgers are also protected under Appendix III of the Berne.

Badgers are known to occur within the wider landscape around the proposed development site. The NBDC lists 54 records of Badger within R70, the most recent from June 2012 (NBDC). Field signs are characteristic and sometimes quite obvious and include tufts of hair caught on barbed wire fences, conspicuous Badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where Badgers have searched for insects and plant tubers. Badgers are omnivorous, feeding on a wide variety of food from invertebrates, small mammals and birds to plant foods such as fruit, nuts and crops. The distribution and abundance of these food resources can have a profound influence on Badger ecology. For example, the size of a Badger social group territory is dependent upon the distribution of key food resources such as earthworms. The density of these key food resources within the territory determines the number of animals within each social group. The sensitive management of these key resources can therefore be a useful tool in mitigating the adverse effects of development. Worm-rich grazed or mown grasslands are a primary foraging resource for Badgers. Alternative or "secondary" habitats may be crucial under certain weather conditions such as drought and frost when earthworms may be difficult to obtain. At such times arable crops such as grains and root crops, and

woodlands, scrub and rough ungrazed grassland will be readily exploited by Badgers. (SNH,2006).

A mixture of walkover and trail camera surveys were carried out to access the value of the proposed development site for badger. It is noted that passive monitoring using trail cameras is particularly valuable for nocturnal animals such as Badger. Following the discovery of a Badger latrine in lands to the south of the proposed development site, trail cameras (Bushnell Trail Camera HD and were installed on the site boundary from the 6th to 26th April 2023 (see Figure 8.4). No signs of Badger were recorded on these cameras. No Badger setts were recorded within 150m of the proposed development site. However, the improved agricultural grassland habitats within the proposed extension area are likely to provide foraging habitat for local Badger populations. The proposed development site is of local importance, higher value for foraging Badger.

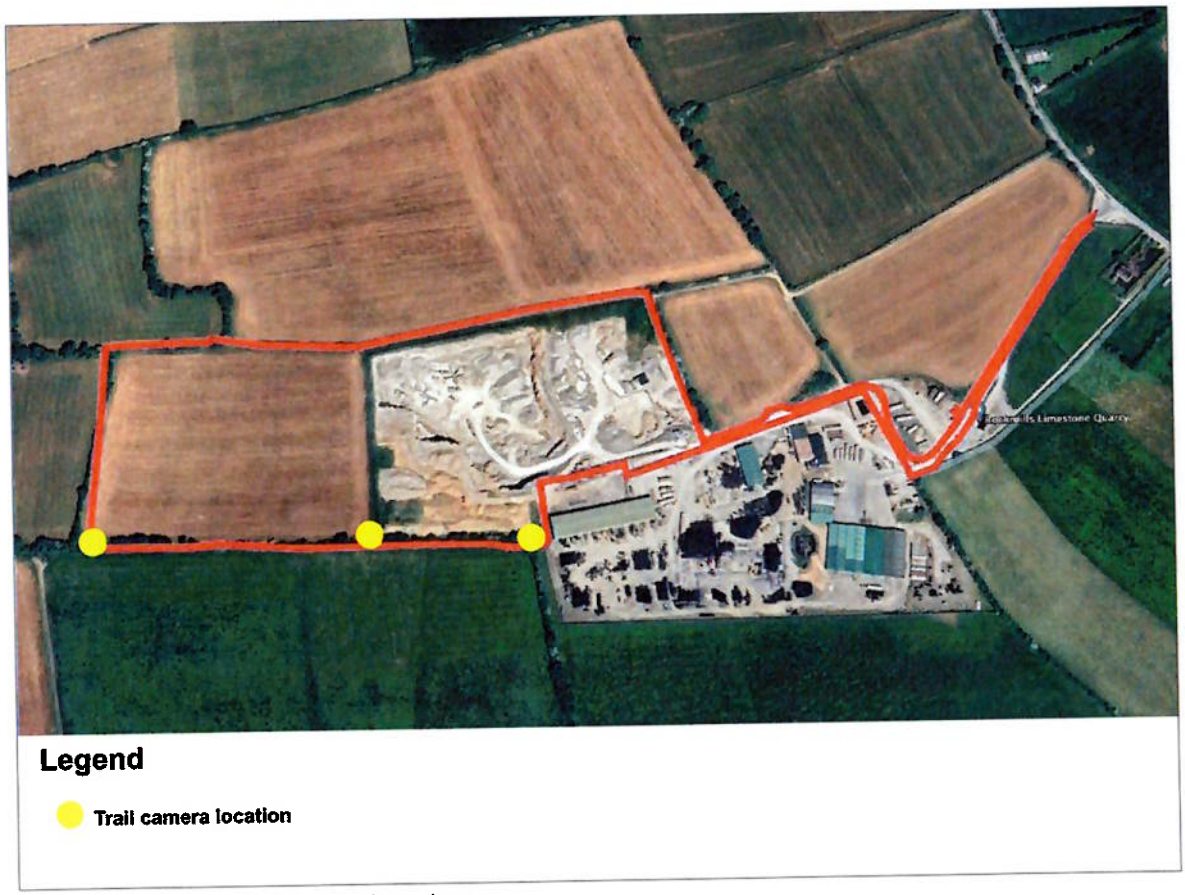

Figure 8.4: Trail camera locations

8.4.4.4 Other Mammals

Six mammals protected under the Irish Wildlife Act have been recorded within R70; namely Irish Hare *Lepus timidus hibernicus* , Hedgehog *Erinaceus europaeus*, Red Squirrel *Sciurus vulgaris*, Red Deer *Cervus elaphus* Pygmy Shrew *Sorex minutus*, and Fallow Deer *Dama dama*.

8.4.4.4.1 Irish Hare

The Irish hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

The Irish hare is adaptable and lives in a wide variety of habitats. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover. There are three records of Irish Hare in R70, the most recent from September 2014. No signs of Hare were recorded although this species and the habitats within the proposed development site are no valuable for this species. The site is of low value for this species.

8.4.4.4.2 Red Squirrel

Red Squirrel also listed on Appendix III of the Berne Convention can be found throughout Ireland. Red Squirrels feed mainly on tree seeds, although they can utilise fungi, fruit and buds as they become available in the woodland. They are found in all types of habitat but typically are in higher densities in mature mixed broadleaved forests. They can also survive in monoculture coniferous woodland. Red squirrel is known to occur in the wider area (NBDC records). No signs of Red Squirrel was recorded during the site surveys and there is no suitable habitat for this species within the proposed development site. The site is of negligible value for this species.

8.4.4.4.3 Pygmy Shrew

Pygmy Shrew is common throughout mainland Ireland. The species is found in a variety of habitats ranging from areas bordering coniferous and deciduous woodland to any area with good ground cover such as grasslands, heaths, hedgerows, peatlands and sand dunes. They are largely absent from heavily forested areas. The Pygmy Shrew requires dense vegetation for cover from its many predators and to provide adequate foraging areas for insects. Due to the habitats present within the proposed site it is likely that Pygmy Shrew are present. The site is of low value for Pygmy Shrew.

8.4.4.4.4 Hedgehog

Listed on Appendix III of the Berne Convention and can be found throughout Ireland, with male Hedgehogs having an annual range of around 56 hectares. No evidence of Hedgehogs was observed during the field surveys, however Hedgehog is likely to occur. The site is of local value for Hedgehog due to the presence of good quality treelines and hedgerows.

8.4.4.4.5 Fallow Deer

Ireland's second largest deer species and are the most widespread of the deer, found in nearly every county of the island. In Ireland the fallow deer mainly resides in mature deciduous or mixed woodlands which are close to open grassland. Fallow deer is not likely to occur within or in the vicinity of the proposed site. From the NBDC records, there is one record of Fallow

deer within hectad R70 from September 2014. Given the habitats present onsite, Fallow Deer are unlikely to occur. The site is of negligible value for this species.

8.4.4.4.6 Red Deer

Red Deer are the largest land mammal found on the island of Ireland. Red deer are primarily grazers, but other food sources if available are taken advantage of, these include heather, dwarf shrubs and rough grasses such as *Molina sp.* found on the uplands. Red Deer have been recorded on one occasion in R70 in October 1990. No habitat suitable for this species was recorded within the proposed development site. The site is of negligible value for this species.

8.4.4.5 Amphibians

The NBDC list one species of amphibian in R80 i.e., Common Frog *Rana temporaria.*

Common Frog is listed in Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. There are no suitable habitat for frogs or any other amphibian species within the proposed development site boundary. The site is of negligible value for amphibians.

8.4.4.6 Reptiles

No reptile species have been recorded within hectad R70. Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands. The species has not been recorded in the surrounding landscape (NBDC) and it is unlikely that the species occurs within or in proximity to the proposed development site. No reptiles were recorded during site surveys. The site is of negligible value for reptiles.

8.4.4.7 Birds

The NBDC has recorded the following Annex I bird species in R70; Kingfisher *Alcedo atthis*, Golden Plover *Pluvialis apricari*, Merlin *Falco columbarius*, Peregrine Falcon *Falco peregrinus* and Whooper Swan *Cygnus cygnus*. No Annex I species were recorded during the site surveys.

A general bird survey was carried out in conjunction with the habitat survey on 8th June 2022, 10th June 2022, 6th April 2023, 26th April 2023. During the survey, all birds seen or heard within the development site were recorded. Bird species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Bird species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the site are shown in **Table 8.9.**

Table 8.9: Bird species recorded during site surveys

Species		Birds Directive	BOCCI	
		Annex I	Red List	Amber List
Hirundo rustica	Barn Swallow			X
Turdus merula	Blackbird			
Parus caeruleus	Blue Tit			
Fringilla coelebs	Chaffinch			
Carduelis carduelis	Goldfinch			
Parus major	Great Tit			
Carduelis chloris	Greenfinch			X
Corvus cornix	Hooded Crow			
Corvus monedula	Jackdaw			
Falco tinnunculus	Kestrel		X	
Anthus pratensis	Meadow Pipit		X	
Motacilla alba	Pied Wagtail			
Erithacus rubecula	Robin			
Corvus frugilegus	Rook			
Riparia riparia	Sand Martin			X
Turdus philomelos	Song Thrush			
Saxicola rubicola	Stonechat			
Columba palumbus	Woodpigeon			
Troglodytes troglodytes	Wren			

Figure 8.5: Signs of Sand Martin nesting activity.

The surrounding landscape is dominated by a mix of good quality agricultural land. The proposed extension area is dominated by pasture. Site boundaries within the extension area include a mixture of hedgerows and treelines which are of value for breeding birds and provide foraging resources. A well-managed, mature, hedgerow will have a three-dimensional structure that provides a range of habitats for invertebrates, birds and mammals. Mature hedgerow trees are often the most valuable because their many branches, fissured bark and holes provide nesting and roosting spaces for birds such as tits and tree creepers.

One Red List species *Anthus pratensis* Meadow Pipit was recorded within the extension area. A single bird was recorded overflying the grassland habitat. While breeding was not confirmed, this species could potentially be breeding within the extension area, as this has not been grazed or cut recently. It is noted that this species will not occur in intensively managed agricultural grassland. Two Amber List species Swallow *Hirundo rustica* and Greenfinch *Carduelis chloris* were also recorded within the extension area.

The Red List species Kestrel *Falco tinnunculus* was recorded overflying the existing quarry area. However, no signs of Kestrel breeding activity were recorded. Signs of Sand martin *Riparia riparia* activity were recorded within the cliffs and stockpiles at the site during the 2023 breeding season. The location of Sand Martin nests will vary from year to year depending primarily on the stability and type of cliff faces available. The location of Sand Martin colonies for the 2023 breeding season is shown in Figure 8.5. Active Sand Martin nest holes were recorded in three locations around the quarry within stockpiles and cliff faces.

Overall, the proposed development site is of local value for terrestrial bird species that are relatively common in the Irish countryside and is of local importance (higher value) for birds.

8.4.4.8 Other Species

NBDC did not return any records for any protected, rare or notable species of invertebrates within 2km of the proposed development site (R70D). Whilst no site is without invertebrate interest, it is considered unlikely that the proposed development site would support any protected invertebrate species as the habitats to be affected are common.

8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

8.5.1 IMPACT CRITERIA

8.5.1.1 Valuation of Ecological Receptors

Annex III of the amended Directive 2014/52/EU requires that the EIAR should assess:

The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected):

- The nature of the impact
- The transboundary nature of the impact
- The intensity and complexity of the impact
- The probability of the impact
- The expected onset, duration, frequency and reversibility of the impact
- The cumulation of the impact with the impacts of other existing and/or approved projects and
- The possibility of effectively reducing the impact.

Potential effects of the construction, operational and decommissioning phases of proposed development on biodiversity include:

- Potential Effects on Habitats
- Potential Effects on Mammals
- Potential Effects on Birds
- Potential Effects on Amphibians and Reptiles
- Potential Effects on Other Species
- Potential Effects from Non-native Invasive Species
- Potential Effects on Water Quality and Aquatic Ecology

8.5.1.2 Magnitude of Impacts

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include positive/negative, extent, magnitude, duration, frequency and timing, and reversibility.

Section 3.7 of the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'*, (EPA 2022) provides standard definitions which have been used to classify the effects in respect of ecology.

8.5.2 SIGNIFICANCE OF IMPACTS

According to the EPA (2022), significance of effects is usually understood to mean the importance of the outcome of the effects and is determined by a combination of objective (scientific) and subjective (social) concerns.

The EPA further notes that:

"While guidelines and standards help ensure consistency, the professional judgement of competent experts plays a role in the determination of significance. These experts may place different emphases on the factors involved. As this can lead to differences of opinion, the EIAR sets out the basis of these judgements so that the varying degrees of significance attributed to different factors can be understood".

With this in mind, the geographic frame of reference applied to determining impact significance by the NRA (2009) in Ireland and CIEEM (2019) in Ireland and the UK, has been adopted in this report in tandem with the EPA's qualitative significance criteria. **Table 8.10** compares the qualitative versus geographic approaches to determining the significance of effects.

Table 8.10: Equating the Definitions of Significance of Effects Using a Geographic vs. Qualitative Scale of Reference

Geographic Scale of Significance (NRA, 2009; CIEEM, 2019)	**Qualitative Scale of Significance of Effects (EPA 2017)**
Negligible or Local Importance (Lower Value). No significant effects predicted to significant ecological features.	Imperceptible. An effect capable of measurement but without significant consequences. Not significant. An effect which causes noticeable changes in the character of the environment but without significant consequences.
Local Importance (Higher Value), County, National, Regional, or International.	Slight / Moderate / Significant / Very Significant / Profound i.e. effects can be slight, moderate, significant, very significant, or profound at Local scale, subject to the proportion of the local population/habitat area affected.

The geographic frame of reference can be a good fit to assessments of biodiversity impacts because it allows clear judgements to be made about the scale of significance, with reference to published estimates for the population size of a given species at county, national and / or international scales or areas of habitats at such scales.

The proportion of a known feature impacted at county scale (i.e., 1% of the known or estimated population in a given county) is measurably different from that impacted at national scale (i.e., 1 % of the known or estimated national population).

A non-geographic qualitative approach can be a poor fit to assessments of biodiversity, since the definitions provided for the different qualitative terms do not relate to measurable units of space such as a county or national boundary. For instance, a significant effect is defined by the EPA as "an effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment without affecting its sensitivities", whilst a very significant effect is that which "by its character, magnitude, duration or intensity significantly.

8.5.3 CONSTRUCTION PHASE IMPACTS

8.5.3.1 Designated Sites

DixonBrosnan prepared a screening for Appropriate Assessment (AA) screening report (which accompanies this planning application). This report investigated the potential for the proposed development to have significant effects on Natura 2000 sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. Although this report identified a potential source-pathway receptor link between the proposed development site and the Blackwater River (Cork/Waterford) SAC and Blackwater Callows SPA, the report concluded that even in the absence of mitigation measures, the proposed development would not impact on these Natura 2000 sites. As noted in Section 8.4.2.2 no potential pathway to NHAs/pNHAs was identified.

8.5.3.2 Habitats

Impacts on terrestrial habitats are generally restricted to direct removal of habitats. Indirect impacts may occur via damage and disturbance arising from vehicular activities and deposition of material. Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors. Any significant dust generation, dispersion and deposition operational activities are considered an environmental nuisance for sensitive receptors within the vicinity of a development. While it is noted that levels of dust during construction are predicted to be low and effectively managed by mitigation, given the common habitats surrounding the proposed development site, the impact on vegetation in adjoining habitats from wind-blown dust is predicted to be imperceptible. No rare floral species were recorded within the study area. Based on the criteria outlined by EPA 2022, as described above, the predicted impacts are detailed in **Table 8.11**.

No Annex 1 terrestrial habitats or other high value terrestrial habitats will be directly or indirectly impacted. No rare flora species were recorded at the site. It is noted that impacts on qualifying species and habitats within nearby Natura 2000 sites are specifically addressed by the AA screening which accompanies this application.

Table 8.11: Potential impact as a result of the proposed development

Habitat	Ecological value (NRA guidelines)	Potential Impact
Improved agricultural grassland (GA1)	Local importance (Lower value)	This habitat will be removed. Negative, not significant, long-term
Earthbank (BL2)/Improved agricultural grassland (GA1)/Dry meadows and grassy verges (GS2)	Local importance (Lower value)	This habitat will be removed. Negative, not significant, long-term

Habitat	Ecological value (NRA guidelines)	Potential Impact
Hedgerows (WL1)/ Treelines (WL2)	Local importance (Higher value)	These habitats will be retained as part of the landscape plan. However, in the absence of mitigation, root protection areas could be impacted. Negative, slight, long-term.
Buildings and artificial surfaces (BL3)	Local importance (Lower value)	The exiting quarry will be retained in its current form. No impact predicted until reinstatement occurs. The impact will be not significant.
Active quarries and mines (ED4)	Local importance (Lower value)	The exiting quarry will be retained in its current form. No impact predicted until reinstatement occurs. The impact will be not significant.

8.5.3.3 Invasive Species

No third schedule invasive species or species which are at risk of having damaging effects were recorded within the proposed development site. No significant impact from the spread of invasive species during the construction stage will occur.

It is noted that the medium impact invasive species Buddleia was recorded along the northern boundary of the existing quarry. No precise studies have been done on the level of impact of Buddleia, likely due to its long history of naturalisation but it is likely to displace native plants where it is present. Given the relatively low risk posed by these species to the surrounding habitats no significant impacts have been identified. However, in the absence of mitigation Buddleia could potentially spread to disturbed habitats during construction works.

8.5.3.4 Bats

There are no buildings or mature trees recorded within the proposed development site which provide suitable roosting sites for bats. There are no semi-mature or mature trees earmarked for removal and no potential for direct injury to bats.

The treelines within the extension area are likely to provide commuting/foraging routes for local bat populations and connect the site to foraging habitat outside the site boundary. As

noted above, treelines will be retained as part of the landscape plan and there will be no loss of potential foraging/commuting habitats.

As works will largely be confined to daytime hours, lighting will be minimal and there will no impact on nocturnal foraging bats from lighting during construction works.

Overall, the loss of semi-natural habitat and increased lighting and disturbance during construction will not impact significantly on local impact on bats. The impact on foraging bats from habitat loss and construction activities will be negative, not significant and long term at a local geographic level.

8.5.3.5 Otter

There are no records of the Otter in the vicinity of the proposed development site and no signs of Otter recorded during site visits. Otter are likely to forage in the Funshion River, located approximately 1.2km northeast of the site. No signs of Otter including spraints, trails, couches and holts were noted during the site surveys. The proposed works will result in an increase in noise and disturbance during the construction works which will be carried out during daytime hours. It is noted that the extension area is located adjacent to an existing active quarry.

Given Otter's largely nocturnal habits, ability to move away from short-term disturbance and ability to habituate to anthropogenic noise and disturbance, the impact on Otter from construction works will not be significant. The impact on construction works on Otter will be neutral, imperceptible and short-term.

8.5.3.6 Badger

No Badger setts were recorded in the vicinity of the site, although Badger activity was recorded to the south of the extension area. A mammal track was recorded along the southern boundary of the extension areas, although no signs of active Badger foraging was recorded. The grassland habitats within the proposed extension area do provide suitable feeding habitat for this species. Badgers could potentially be affected via loss of habitat and increased noise and disturbance.

There will be a net loss of potential feeding habitat within the proposed extension area. Badgers show a strong preference for pasture used for cattle. Under the NRA guidelines (NRA, 2006a) where loss of habitat is likely to be greater than 25%, the impact may be considered as significant on the affected social group. While foraging activity was recorded to the south of the extension areas, no signs of Badger foraging was recorded within the within the extension area itself. The loss of foraging habitat as a result of the proposed development is not predicted to be significant. Although there is considerable regional variation the mean density of Badger social groups in Ireland has estimated at 1 group per 2 km^2 (0.495 per km^2). There are no extensive areas of wetland habitat which could provide critical resources for local Badger populations during dry summers. It is concluded therefore that the removal of habitats within the proposed extension area will not result in the loss of a particular social group of Badgers although a contraction in population size or changes in feeding pattern may occur. Overall, the impact is predicted to be negative, moderate and long-term.

8.5.3.7 Other Mammals

Hedgehog, Irish Hare etc have all been recorded within grid square R70. Mammal species which are protected under the Irish Wildlife Act 1976, as amended, such as Hedgehog could potentially occur within the proposed development site, although no signs of these species were recorded. Although the habitats to be directly affected may form part of the territories of various mammal species, they do not provide critical resources and direct impacts on these habitats will be localised and temporary. Increased noise and disturbance is predicted to occur during construction and operation of the site. It is noted that the extension area is located adjacent to an existing active quarry.

The construction works will remove agricultural grassland habitat and largely retain higher value habitat of hedgerows and treeline. Overall the impact on other mammals is predicted to be negative, slight and long-term at a local level.

8.5.3.8 Amphibians and Reptiles

No construction impacts on amphibians or reptiles are predicted to occur.

8.5.3.9 Birds

The terrestrial bird species recorded within the proposed development site are generally typical of the habitats onsite and are generally common. Meadow Pipit, which is a Red List species of conservation concern was recorded overflying the area during the site survey. This species could breed within the extension area. However, it is noted that the habitat to be affected within the proposed the proposed extension area is suboptimal for this species and is only utilised when management is less intensive. Intensive management in the absence of the proposed development, would make this area unviable for breeding.

Treeline/hedgerow at the site will be retained. The landscape plan for the quarry includes planting along the external boundaries of the site i.e. double line of hawthorn whips has been planted at 1m spacing . As these trees/shrubs mature they will provide a diverse native treeline on the boundary of the site which will provide foraging and nesting habitat for local birds.

The existing quarry provides suitable habitat for nesting Sand Martins and there is the potential for birds such as Raven and Peregrine Falcon to use existing cliff faces.

In general, the habitats within the proposed development site are utilised for feeding/nesting by a range of common bird species. However there is no evidence to indicate that the habitats to be affected are of significantly higher value than large areas of similar habitat in the surrounding countryside. With the exception of cliffs/stock piles for breeding Sand Martin, which are created by quarrying activity, no critical resources for rare or uncommon bird species were recorded. Some disturbance/displacement of feeding birds may occur due to increased noise and disturbance. As the levels of activity will stabilise, birds in the surrounding landscape will be expected to habituate to any increased noise and disturbance

Some displacement of feeding birds may occur during construction due to increased noise and disturbance. Disturbance can cause sensitive species to deviate from their normal, preferred

behaviour, resulting in stress, increased energy expenditure and, in some cases, species mortality. However this disturbance will be short-term. It is noted that the extension area is located adjacent to an existing active quarry. Birds which use this area will be largely habituated to similar background noise levels. Whilst works could potentially disrupt feeding patterns, given the availability of similar habitat in the surrounding area and the ability of birds to move away from disturbance, the impact on the feeding behaviour of these species is predicted to be slight. The construction works will lead to a negative, slight and short-term impact on breeding birds.

8.5.3.10 Other Species

The proposed development area is only likely to support common invertebrate species. The landscaping plan includes a range of native species. The use of native trees is considered very important in increasing the ecological value of a given site. For example, native willow can support over 200 species of insect, a non-native conifer such as Leyland Cypress will support very few. The incorporation of a range of native species which flower and fruit at different times can help to support invertebrate species at different stages of their lifecycle and will also help to create a natural woodland structure. The proposed development will result in a negative, not significant and long-term impact on local invertebrate species.

Mitigation measures during construction will ensure there is no impact on water quality. There are no watercourses in the vicinity of the site. The closest watercourse is the River Funshion 1.2km northeast. There is the potential for minor leaks of hydraulic and engine oil to occur from the vehicles and mobile plant accessing the extension area. However given the volumes involved and the attenuation capacity provided by the in situ soils any such incidents will have only a slight and highly localised negative impact on the groundwater in the subsoils no impact on the bedrock aquifer. There is no dewatering required onsite, as all extraction takes place at least above the water table. No significant impact on aquatic receptors has been identified.

8.5.4 OPERATIONAL PHASE

In the absence of mitigation measures, significant operation phase impacts could include light spillage onto retained vegetation/valuable habitats outside the site boundary used for foraging or breeding by protected species. Impacts on local groundwater could potentially impact on aquatic species and habitats. Disturbance to protected species could occur from noise or vibration associated with traffic and extraction works and blasting.

Habitat loss and the spread of invasive species within the proposed development site has been considered above in **Section 8.5.3.1.**

8.5.4.1 Designated Sites

DixonBrosnan prepared a screening for Appropriate Assessment (AA) screening report (which accompanies this planning application). This report investigated the potential for the proposed development to have significant effects on Natura 2000 sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. Although this report identified a potential source-pathway receptor link between the proposed development site and the Blackwater River (Cork/Waterford) SAC and Blackwater Callows SPA, the report concluded that even in the absence of mitigation measures, the proposed development would not impact on these Natura 2000 sites. As noted in Section 8.4.2.2 no potential pathway to NHAs/pNHAs was identified.

8.5.4.2 Habitats

It is noted that there is no runoff from the existing quarry pit, as all water infiltrates into the groundwater. There is no general stormwater pipework or management system at the site. All rainfall that falls within the footprint of the quarry infiltrates into the services area floor or the quarry floor and migrates vertically down to the water table. There is no discharge to surface-water from the quarry.

As described in **Section 2.4.2**, 1.749ha of land will be restored to mixed habitats via natural recolonisation, which will create areas of habitat for wildlife. This will ensure that such areas are colonised by a mixture of native species from the surrounding landscape. These species will be appropriate to the local conditions.

8.5.4.3 Invasive Species

No operational impacts identified.

8.5.4.4 Bats

Increased activity and human presence, noise and artificial lighting may impact and disturb or displace bats during the operational phase of the proposed development. However, given that quarry operations will largely be confined to daylight hours, and the boundary vegetation will be retained, no significant impact on foraging bats is predicted to occur. Where habitats are retained i.e. treelines/hedgerows, bats will continue to forage over habitats on the site boundary. The landscape plan included additional boundary planting of 1m hawthorn whips along the berm. As these habitats mature, they are likely to create additional commuting and foraging habitat for local bat.

During reinstatement of the existing quarry, natural recolonisation within Areas 2R and 3R (See **Figure 2.6**) will allow scrub/woodland habitat to develop over time which will provide foraging and commuting habitat for bats at these habitats mature. Key bat foraging areas are likely to be located along internal boundary hedgerows/treelines within the extension area. The trees within the site boundaries lack the structural elements that would make them suitable for roosting bats. Therefore bat boxes will be provided as outlined in the restoration plan.

The impact on bats is predicted to be negative, not-significant in the short to medium term. As the reinstated habitats mature, the impact will be positive, slight in the long term.

8.5.4.5 Otters

Increased activity and human presence, noise and artificial lighting may impact and disturb or displace Otter during the operational phase of the proposed development, including light spillage onto previously unlit boundary habitats. As noted above the proposed development has site is of negligible value for Otter. Quarry operations will largely be confined to daylight hours, no impact on foraging bats is predicted to occur. While blasting will be required for quarry operations, this will be limited to daytime hours with no more than one blast per month.

An area of ephemeral wetland will be created within the restoration area. This has the potential to provide habitat for Common Frog which is an important food source for Otter.

The impact on Otter is predicted to be neutral, imperceptible and long-term. As the existing quarry in reinstated, the impact will be positive, slight and long-term.

8.5.4.6 Other Mammals

Increased activity and human presence, noise, fencing and additional lighting may disturb or displace other mammal species such Hedgehog and Pygmy Shrew from favoured foraging habitats during the operational phases of the proposed development. While blasting will be required for quarry operations, this will be limited to daytime hours with no more than one blast per month. The landscape plan included additional boundary planting to supplement existing planting along the quarry berms. As these habitats mature, they are likely to create additional refuges and foraging habitat for local mammal species.

During reinstatement of the existing quarry, natural recolonisation within Areas 2R and 3R (See **Figure 2.6**) will allow scrub/woodland habitat to develop over time which will provide foraging areas and areas of cover for small mammal species. Areas of scrub within intensively farmed agricultural areas, such as those surrounding the proposed development site, are likely to create wildlife refuges and green corridors for small mammals such as Pygmy Shrew, Irish Stoat and Hedgehog as they mature.

During operation impacts on other mammals are predicted to be negative, slight in the short to medium-term at a local level. As the reinstated habitats mature, the impact will be positive, slight in the long term.

8.5.4.7 Amphibians and Reptiles

An area of ephemeral wetland will be created within the restoration area. This has the potential to provide habitat for Common Frog.

During operation, impacts on amphibians are predicted to be neutral, imperceptible in the short to medium-term at a local level. As the reinstated habitats mature, the impact will be positive, slight and long-term.

No operational impacts on reptiles have been identified.

8.5.4.8 Birds

Following habitat removal during construction the Red List species Meadow Pipit will be displaced from the site however the habitat to be affected is suboptimal for this species No significant change in the number of common bird species which the site supports is predicted to occur due to the retention of boundary treelines/hedgerows. The landscape plan includes additional boundary planting along the site berms. As these habitats mature, they are likely to create additional nesting and foraging habitat for common local bird species. As part of the landscape plan, Sand Martin habitat will be retained/created within the existing quarry and extension area.

Visible human presence in previously undisturbed areas and increased noise and lighting may prevent birds from nesting or foraging in retained habitats within or adjacent to the site. In areas where nesting habitat is retained within the site e.g., boundary woodland and scrub, operational lighting may impact on breeding birds. During operation lighting will largely be confined to daytime hours and no significant ongoing disturbance to habitats within or on the edge of the proposed extension area is predicted to occur.

During reinstatement of the existing quarry, natural recolonisation within Areas 2R and 3R (See Figure 2.6) will allow scrub/woodland habitat to develop over time which will provide foraging areas and areas of cover for small mammal species. Areas of scrub within intensively farmed agricultural areas, such as those surrounding the proposed development site, are likely to create foraging and nesting habitats for birds as they mature. An area of ephemeral wetland will be created within the restoration area could potential create habitat for more specialist birds such as Reed Bunting and Willow Warbler. This area of the quarry will not be regraded and the retained cliffs could potentially provide habitat for Peregrine Falcon which regularly nest in quarries.

The impact on birds during operation is predicted to be negative, slight in the short-medium term and positive, slight in the long-term at a local level.

8.5.4.9 Other Species

Areas of recolonising habitat and ephemeral wetland have to potential to provide a range of habitats for terrestrial invertebrates during the restoration phase of the quarry.

During operation, impacts on terrestrial invertebrates are predicted to be neutral, imperceptible in the short to medium-term at a local level. As the reinstated habitats mature, the impact will be positive, slight and long-term.

No operational impacts on reptiles have been identified.

As noted in **Section 8.5.4.1**, no operational discharges to surface water will occur and no impact on aquatic species has been identified.

8.5.5 'DO-NOTHING' SCENARIO IMPACT

Most of the site i.e. improved agricultural grassland and activity quarry habitats has been significantly modified from the natural state by human activity. The management regime, means that there is limited diversity of flora or fauna within this habitat, which dominates the site. Agricultural inputs could potentially impact on local water quality.

Areas of semi-natural habitat i.e. treelines/hedgerow are present at the site and these will remain intact in the absence of development. However, ash dieback disease will continue to impact on ash trees on the boundary of the site. In the absence of management, Buddleia is likely to spread to recolonising areas within the active quarry.

8.5.6 CUMULATIVE IMPACT

Considering the nature of the development and the predominately agricultural land the most significant impacts would be direct impacts on flora and fauna species and / or loss or fragmentation of low value habitat.

With regards water quality, no direct discharges to surface water are proposed and no impact on aquatic flora or fauna have been identified.

With regards potential habitat loss or fragmentation of habitat, the proposed development is not anticipated to result in a significant impact upon habitat loss / fragmentation during either the construction or operational phases, given that the majority of the land take would comprise of modified habitats of low ecological value. As the reinstated areas of the existing quarry are allowed to recolonise, locally valuable habitats will be created i.e. scrub, woodland, semi-natural grassland and wetland. Therefore, there would be no cumulative habitat loss or fragmentation impacts which could pose a significant risk to biodiversity.

8.5.7 'WORST CASE' SCENARIO

If the proposed development proceeded without the mitigation measures outlined in **Section 8.7**, there would be a potential moderate impact upon Badgers species due to the removal of foraging habitat. There would also be a potential moderate impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. If quarrying activity were to continue is areas of active Sand Martin nests, direct injury or mortality is likely to occur.

During construction works, there would be potential to inadvertently introduce/spread invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site.

8.6 MITIGATION MEASURES

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts. Construction mitigation measures are set out in this EIAR. These measures have particular emphasis on the protection of valuable habitats which adjoin the site i.e. treeline/hedgerow habitats and active Sand Martin nests. It is essential that all construction staff, including all sub-contracted workers, be notified of valuable habitats and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these areas and that care must be taken with liquids or other materials to avoid spillage.

Mitigation measures (of relevance in respect of any potential ecological effects) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- *Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.* Masters-Williams *et al.* (2001)
- *Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA.* Murnane, *et al.* (2006)

All personnel involved with the proposed development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

All staff and subcontractors have the responsibility to:

- Understand the importance of avoiding pollution onsite, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the project manager;
- Monitor the workplace for potential environmental risks and alert the site manager if any are observed; and
- Co-operate as required, with site inspections.

As part of the assessment of the required construction mitigation, best practice construction measures which will be implemented for the proposed development were considered. A summary of the measures relevant to hydrology are provided as follows and are in accordance with *Construction Industry Research and Information Association (CIRIA) guidance – Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors* (Masters-Williams et al. 2001).

8.6.1 WATER QUALITY

Details of water quality mitigation measures are included in Chapter 9 Land - Soils, Geology, Hydrology & Hydrogeology.

8.6.2 AIR QUALITY

Details of water quality mitigation measures are included in Chapter 5 Air Quality and Climate.

8.6.3 NOISE

The employment of good construction management practice, as described in Chapter 6 Noise Environment, will minimise the risk of adverse impacts from the noise and vibration during the construction phase.

Mitigation measures will be employed to ensure that potential noise and vibration impacts at nearby sensitive receptors due to construction activities are minimised. The preferred approach for controlling construction noise is to reduce source levels where possible, but with due regard to practicality.

8.6.4 LIGHTING

8.6.4.1 Construction Lighting

Lighting associated with the site works could cause disturbance/displacement of fauna. If of sufficient intensity and duration, there could be impacts on reproductive success.
Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010). The following measures will be applied in relation to construction works lighting:

- Lighting will be provided with the minimum luminosity necessary for safety and security purposes. Where possible, lighting will be restricted to the working area and using the cowl and angling noted above, will minimise overspill and shadows on sensitive habitats outside the construction area and
- During construction, lighting will be positioned and directed so that it does not to unnecessarily intrude on adjacent ecological receptors. The primary area of concern is the potential impact at the retained treelines and hedgerows on the site boundary. There will be no directional lighting focused towards these areas and cowling and focusing lights downwards will minimise light spillage.

8.6.4.2 Operational Lighting

It is noted that works operational activity will be confined to daytime hours (07:30hrs – 18:00hrs Mon-Fri 07:30hrs-16:00hrs Saturday). Therefore, operational lighting will only be required during the winter months and will not impact on bats (as this coincides with bat hibernation). However that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Hedgehog.

- The lighting scheme has taken into account best practice, as published by the UK Bat Conservation Trust, in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.
- Screening by existing trees will be retained.
- Lighting will be focused away from treelines and hedgerows along external boundaries.
- Spacing between lights will be maximised.

8.6.5 PROTECTION OF HABITATS AND FLORA SPECIES

No tree removal is required. However, where vegetation is removed the following should be noted. The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land or such growing in any hedge or ditch from the 1st March to the 31st August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided.

Trees along the boundary will be protected in accordance with BS: 5837:2012 Trees in relation to design, demolition and construction. Recommendations and any further agreed procedures. Tree root systems can be damaged during site clearance and groundworks. No materials should be stored within the root protection area of mature trees. Materials, especially soil and stones, can prevent air and water circulating to the roots. Retention of the existing networks of treelines/hedgerows that form the external boundaries of the site will provide natural screening and help to maintain biodiversity.

A double line of hawthorn whips has been planted at 1m spacing along the site berms. Planting has occurred on the external bunds and existing hedgerow (blackthorn, elder, wild rose and mature ash) along the eastern boundary of the service yard / stockpile area. The proposal includes 2m (high) x 6m (wide) boundary earth berms surrounding the proposed quarry extension. The berms will be planted with a double line of hawthorn whips has been planted at 1m spacing.

A Closure, Restoration and Aftercare (CRA) plan was submitted as requested further information (RFI) on planning application 15/5484, as shown in **Chapter 2, Figure 2.4** of this EIAR.

8.6.6 BIRDS

As noted above vegetation will be removed outside of the breeding season where possible and in particular, removal during the peak-breeding season (April-June inclusive) will be avoided.

This will also minimise the potential disturbance of breeding birds outside of the study area boundary.

It is noted that Sand Martin colony locations within the active quarry is likely to change over time with some areas being lost and other areas created on an ongoing basis. A Sand Martin survey will be carried out prior to the commencement of each breeding season to ensure that there is suitable breeding habitat available and to specify suitable buffer zones/work practices. The objective on an ongoing basis is to ensure that there is sufficient habitat available to maintain a viable breeding population within the existing quarry. Under no circumstances will there be direct impacts on habitat supporting actively breeding birds. A survey will be carried out prior to the closure of the quarry and site specific mitigation, based on up to date survey data, will be incorporated into the final closure plan.

As a biodiversity enhancement measure ten bird nesting boxes (various types including open fronted and entrance hole) will be located within the site boundary at locations specified by an ecologist.

It is noted that provision of existing and proposed tree planting will provide additional nesting and feeding sites for birds, particularly as these habitats mature.

8.6.7 INVASIVE SPECIES

It is noted that the amber list species Buddleia was recorded at the proposed development site. As noted above, there is no statutory obligation to remove this species. However, should it be concluded that they should be removed, the following treatment methods are recommended. Buddleia is straightforward to control using a mixture of mechanical removal and herbicide treatment. Where Buddleia are present in areas of habitat to removed, the following mitigation measures should be implemented under supervision of the project ecologist.

- Buddleia favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Therefore, care needs to be taken to ensure re-vegetation of controlled areas is undertaken swiftly. The branches of Buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk.
- As mature plants occur within the proposed works area, the preferred method of treatment is cutting back to a basal stump or grubbing out followed by chemical treatment. Herbicide applications will consider sensitive receptors such as watercourses and locally important habitats such as woodland and must only be applied in line with manufacturers recommendations.
- Recommended practice for the application of herbicides requires cutting back of plants to a basal stump during active growth (late spring to early summer) which is then treated (brushed on) immediately with a systemic weed killer mix (Starr *et al.* 2003). Foliar application of triclopyr or glyphosate may be adequate for limited infestations of younger plants but should be followed up at 6 monthly interval until the supervising ecologist can certify that the plant is no longer extant within the works area.

8.7 RESIDUAL IMPACTS

8.7.1.1 Designated Sites

No significant impacts on water quality are predicted to occur and subsequently there will be no impact on Natura 2000 sites/NHAs/pNHAs downstream of the proposed development site.

8.7.1.2 Habitats

The mitigation measures have been drawn up in line with current best practice. It is clear that the mitigation measures are designed to achieve a lowering or reducing of the risk of impact to acceptable levels. The likely success of the proposed mitigation measures is high, either in their current form or as they will be adapted on-site to achieve the desired result. Whilst the proposed methods of mitigation may be amended and supplemented, the risk that the mitigation measures will not function effectively in preventing significant ecological impacts is low.

In respect of terrestrial habitats, the development will result in the loss of grassland habitats at the site. Treeline/hedgerow habitat will be retained and enhanced with the ongoing/proposed landscape plan. This will mean there will be a net gain of treeline and hedgerow habitat within the proposed development site during operation of the quarry. The existing and proposed planting along existing boundaries will improve the quality of boundary habitat at the site to local importance (higher value) habitats. There will be no impact on aquatic habitats and mitigation measures during construction will ensure there are no impacts on local groundwater (or surface waters). During operation of the proposed extension the impact of this will be negative, not significant and long term at a local level over time. As the reinstated habitats within the existing quarry mature, there will be a positive, slight and long-term impact on local habitats.

8.7.1.3 Fauna

No bat roosting habitat will be impacted. Treeline/hedgerow habitat will be retained and enhanced with the ongoing/proposed landscape plan. During reinstatement of the existing quarry, natural recolonisation within Areas 2R and 3R (See Figure 2.6) will allow scrub/woodland habitat to develop over time which will provide foraging and commuting habitat for bats at these habitats mature. This will mean there will be a net gain of treeline/hedgerow and scrub/woodland habitats within the proposed extension area and the existing quarry. These habitats will in time mature to provide high quality bat foraging habitat and connectivity with the local landscape. The impact on bats is predicted to be negative, not-significant in the short to medium term. As the reinstated habitats within the existing quarry mature, the impact will be positive, slight in the long term.

There are no valuable habitats for Otter within the proposed development site. However, following reinstatement wetland habitat could potentially provide foraging habitat for Otter.

The proposed development will result in the loss of primary Badger foraging habitat i.e. improved agricultural grassland within the extension area. Although no signs of active foraging were recorded within the extension area, this grassland is likely to fall within the territory of local Badger populations. Under the NRA guidelines (NRA, 2006a) where loss of habitat is likely to be greater than 25%, the impact may be considered as significant on the affected social group. The proposed development will result in the loss of approximately 4.21ha (42,100m^2)

of grassland (3.84ha for extraction). Although there is considerable regional variation the mean density of Badger social groups in Ireland has estimated at 1 group per 2 km^2 (0.495 per km^2). There are no extensive areas of wetland habitat which could provide critical resources for local Badger populations during dry summers. It is concluded therefore that the removal of habitats within the proposed extension area will not result in the loss of a particular social group of Badgers although changes in feeding pattern may occur. Overall, the impact is predicted to be negative, slight and long-term on the local Badger population.

There are likely to be short-term disturbance impacts to other mammals during construction works. However, the landscaping and restoration plan will ensure that in the long term additional and improved habitat for mammals is created. Areas of scrub within intensively farmed agricultural areas, such as those surrounding the proposed development site, are likely to create wildlife refuges and green corridors for small mammals such as Pygmy Shrew, Irish Stoat and Hedgehog as they mature. During operation impacts on other mammals are predicted to be negative, slight in the short to medium-term at a local level. As the reinstated habitats mature, the impact will be positive, slight in the long term.

As the planted treeline/hedgerow habitats on the boundary of the quarry mature, they will create new nesting and foraging habitat for local bird species. However, there will be a loss of grassland habitat during construction works, which will remove potential breeding habitat for grassland nesting birds such as Meadow Pipit. Sand Martin habitat will be retained/created within the existing quarry and extension area. As reinstated habitats within the existing quarry mature, they will provide a range of potential habitats and niches for bird species.
The impact on birds is predicted to be negative, slight in the short-medium term and positive, slight in the long-term at a local level.

Detailed mitigation measures have been specified to minimise impacts on groundwater and surface water. No significant impacts on groundwater are anticipated provided mitigation measures are adhered to. No significant impact on surface water will occur. The impacts on aquatic fish and invertebrates as a result of the proposed development will be imperceptible.

8.7.1.4 Invasive Species

Following the implementation of mitigation measures outlined above, no residual impacts form the spread of invasive species is predicted to occur.

8.8 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

Standard survey methods were followed. However, any biases or limitations associated with these methods could potentially affect the results collected. Although every effort was made to provide a full assessment and comprehensive description of the study area, natural fluctuations in populations may not be fully reflected due to the instantaneous nature of the field surveys. However, the field surveys together with the background knowledge provided by the desk study, provides a robust representation of the baseline for the habitats and species within the zone of influence.

There are difficulties in mapping areas of Badger territory and other species in third party lands outside the control of the applicant. It can be difficult to determine territory size in Badger populations particularly where they may include multiple landholdings. Therefore, in this case a conservative approach was adopted in determining impact on Badger social groups.

8.9 REFERENCES

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9.0 LAND - SOILS, GEOLOGY, HYDROLOGY & HYDROGEOLOGY

9.1 INTRODUCTION

9.1.1 BACKGROUND & OBJECTIVES

IE Consulting were engaged by Murphy McCarthy Consulting Engineers on behalf of Rockmills Quarry Ltd to carry out an assessment of the potential impacts of the proposed expansion of the limestone quarry at Carrigdownhane Upper, Rockmills, Co. Cork on the land, soil and water environment.

The proposed development involves the extension of the quarrying operations to the west, into a landbank 4.21 hectares (extractable area 3.84Ha). Limestone will be extracted through blasting, crushing and screening before being loaded onto trucks for use primarily in the agricultural industry. The extraction will remain above the water table.

The objectives of the assessment are:

- Prepare a baseline study of the existing land, soil and water environment (surface, groundwater and water management within the quarry) in the area of the proposed development site;
- Identify likely negative impacts from the proposed site operations on the land, soil and water environment during the construction, operation and decommissioning phases of the development;
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts;
- Assess significant residual impacts and cumulative impacts of the proposed site operations on the land, soil and water environment.

9.1.2 STATEMENT OF AUTHORITY

This chapter of the EIAR was prepared by Kevin Murphy, under the technical direction and supervision of Jerome Keohane of IE Consulting Engineers Ltd.

Further details of competence and expertise is included in **section 1.7** of this EIAR.

9.1.3 RELEVANT LEGISLATION

This EIAR was completed in accordance with the following legislation:

- Planning & Development Act, 2000, as amended;
- The EU Water Framework Directive (WFD), 2000/60/EC;
- The EU Groundwater Directive, 2006/118/EC;
- The EU Floods Directive, 2007/60/EC;
- European Communities (Water Policy) Regulations 2014 (S.I. No. 350 of 2014);
- European Communities (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014);
- Water Services Acts (2007 – 2014);
- S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988.
- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010);
- European Communities Environmental Objectives (Groundwater) Regulations 2016 (S.I. No. 366 of 2016);
- European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009);
- European Communities Environmental Objectives (Surface Water) Regulations 2012 (S.I. No. 327 of 2012);
- European Communities Environmental Objectives (Surface Water) Regulations 2015 (S.I. No. 386 of 2015);
- European Communities Environmental Objectives (Surface Water Regulations 2019 (S.I. No. 77 of 2019);
- European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988);
- European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261/2018)

9.1.4 RELEVANT GUIDANCE

This EIAR was prepared with as per the following guidelines:

- EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment
- Environmental Protection Agency (EPA). *Guidelines on Information to be contained in Environmental Impact Statements* (EPA, 2002).
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- Environmental Protection Agency (2006), *Environmental Management Guidelines – Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*. ISBN: 1-84095-189-3

9.2 METHODOLOGY

9.2.1 DESK STUDY

A desk study of land, soil and water conditions in the vicinity of the site and the proposed extension area was largely completed prior to the undertaking of a site walk over assessment and windshield survey. The desk based study involved the collection of all relevant geology, hydrogeological, hydrological and meteorological data for the site/wider area. This included the following sources:

- Environmental Protection Agency (EPA) GIS Portal
- EPA Catchment Mapping Portal
- EPA Hydrotool Map Viewer
- Geological Survey of Ireland (GSI) Spatial Resources Viewer
- GSI Groundwater Body Descriptions
- Met Eireann Meteorological Databases
- OPW Indicative Flood Maps and Preliminary Flood Risk Assessment Mapping (PFRA)
- OPW Flood Maps Website (www.floodinfo.ie)
- National Indicative Fluvial Flood Mapping (NIFM)
- National Parks & Wildlife Service (NPWS) Public Map Viewer
- Blackwater (Munster) Catchment Report, 3rd Cycle Draft, Catchment Science & Management Unit, EPA, 2022
- Catchment Blackwater (Munster) – Sub-catchment Funshion_SC_020 Report, Catchment Science & Management Unit, EPA, 2018
- Castletownroche Water Supply Scheme - Groundwater Source Protection Zones, GSI (June, 2000).
- Cork North West Regional Water Supply Scheme (Doneraile) Shanballymore Spring - Establishment of Groundwater Source Protection Zone, GSI/EPA (September 2010).
- Kildorrery Water Supply Scheme - Glenavuddig Bridge - Groundwater Source Protection Zone, GSI.

- Glanworth Water Supply Scheme - Ballykenly Spring (Tobermore) - Groundwater Source Protection Zone, GSI.
- Previous hydrological reports in relation the site
- Murphy McCarthy Drawings & Topographical Surveys

9.2.2 SITE INVESTIGATIONS

A site walk over survey of the existing site and proposed extension area, along with a windshield survey of the wider surrounding area was completed by a hydrogeologist from IE Consulting on the 9th May 2022.

9.2.3 IMPACT ASSESSMENT METHODOLOGY

For the purpose of this assessment the impacts of the proposed development on the surrounding environment, are considered for the wider study area at 2km radius from the site. The extent of the wider study area is based on the IGI guideline (2013) which recommends a minimum distance of 2km. Where necessary for continuity, the study was extended beyond the 2 km limit, following the precautionary principle.

Refer to **Section 1.5** of the EIAR for details on the impact assessment methodology.

In addition to the above methodology, the importance of the geological and hydrogeological features was assessed, using the criteria outlined in **Table 9.1**. This is based on guidance from Transport Infrastructure Ireland (TII) on assessing the Land, Soil & Water Environments in EIARs.

Table 9.1: Criteria for Rating the Importance of Geological & Hydrogeological Sites

Importance	Criteria	Geology Example	Hydrogeological Example
Very High	Attribute has very high quality, significance or value on a regional or national scale.	Geological feature of regional or national importance (e.g. NHA) or proven extractable mineral resource	Area where groundwater supports a river, wetland or surface water ecosystem which is protected by EU legislation e.g. SAC/SPA
High	Attribute has high quality, significance or value on a local scale.	Geological feature of high value on a local scale e.g. county geological site or well drained/highly fertile soils	Regionally Important Aquifer
Medium	Attribute has medium quality, significance or value on a local scale.	Small existing quarry or pit or sub-economic extractable mineral resource	Locally Important Aquifer
Low	Attribute has low quality, significance or value on a local scale.	Poorly drained soils/low fertility soils	Poor bedrock aquifer

The geological/hydrogeological environment can then be classified based on guidelines published by the Institute of Geologists of Ireland. A summary of the environmental classifications are outlined in **Table 9.2**.

Table 9.2: Geological/Hydrogeological Environmental Classification

Environment Type	Geological/Hydrogeological Characteristics
Type A	Passive geological/hydrogeological environment e.g. areas of thick low permeability subsoil, areas underlain by poor aquifers, historically stable geological environments
Type B	Naturally dynamic geological/hydrogeological environments e.g. groundwater discharge areas, areas underlain by regionally important aquifers, nearby spring rises, areas underlain by permeable subsoil.
Type C	Man-made dynamic geological/hydrogeological environments e.g. nearby groundwater abstractions, nearby quarrying or mining activities below the water table, nearby waste water discharges to ground, geothermal systems.
Type D	Sensitive geological/hydrogeological environments e.g. potentially unstable geological environments, groundwater source protection zones, karst.
Type E	Groundwater dependent ecosystems e.g. wetlands, nearby rivers with a high groundwater component of base flow

Surface water (hydrology) features are not included in the IGI Guidelines, and require separate consideration. Therefore, a model adapted from the Scottish Environmental Protection Agency (SEPA) has been applied to determine if the surface water receptor is sensitive or not. The approach is summarised in **Table 9.3**.

Table 9.3: Water Receptor Sensitivity Criteria (adapted from SEPA)

Type	Criteria
Not Sensitive	Receptor is of low environmental importance. Heavily engineered or artificially modified watercourses which may run dry in the summer months. Fish are sporadically present or restricted. The environmental equilibrium is stable and resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character.
Sensitive	Receptor is of medium environmental importance or of regional value. Salmonoid species may be present and there may be locally important fisheries. Private abstractions for water supply. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character.
Very Sensitive	Receptor is of high environmental importance or of national or international value e.g. SAC or NHA. Salmonoid spawning grounds present. Abstractions for public drinking water supply.

9.3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

9.3.1 TOPOGRAPHY & SITE SETTING

The existing Rockmills Quarry Limited is located at Carrigdownane Upper, Rockmills, Killdorrery, Co. Cork, P67 YC99. The approximate Irish National Grid (ING) reference for the site is E: 172106, N: 106599.

The site is located approximately 1.2 km south-southeast of the small rural village of Rockmills, 4 km southeast of the village of Killdorrery, 4 km northwest of the village of Glanworth. Mitchelstown and Fermoy are located approximately 12 km to the northeast and southeast respectively.

The site is accessed via a private entrance from the L5612.

The site access is shared with an adjacent business, Crossmore Tyre Recycling Ireland, which is under the ownership of the extended family of the applicant. The businesses are operationally separate with no shared services, plant or equipment.

The topographical setting is shown in **Figure 9.1**.

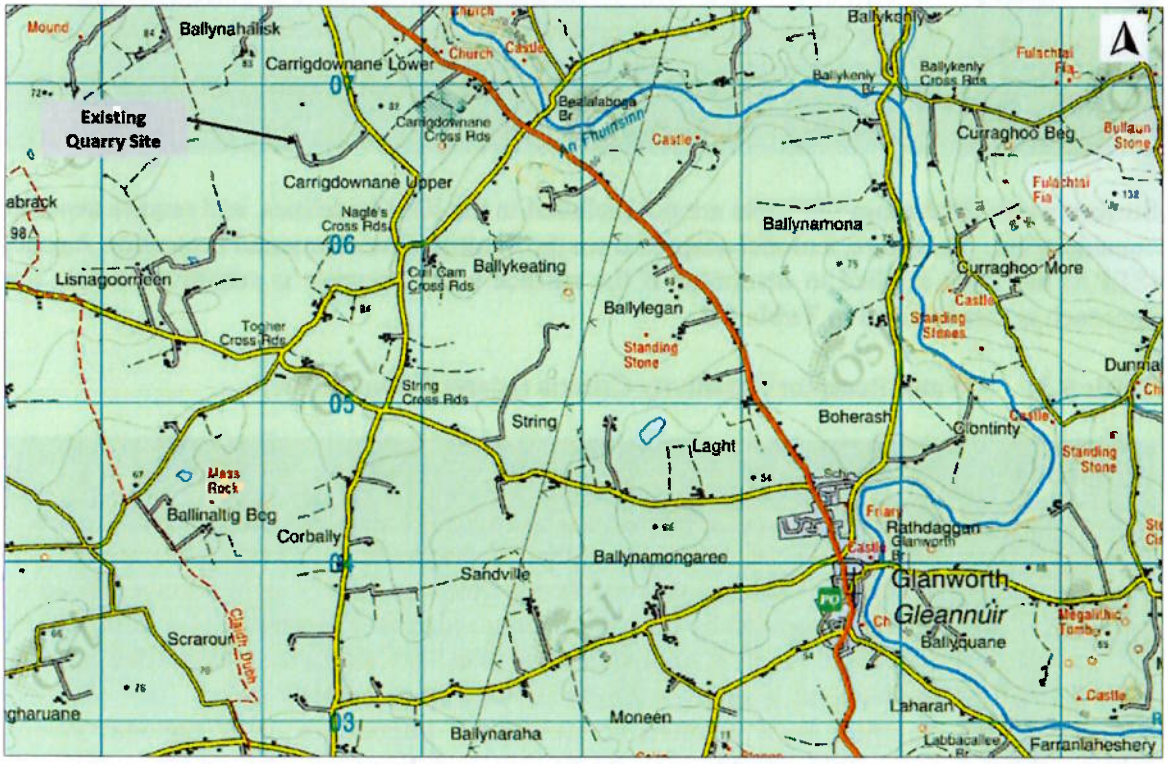

Figure 9.1: Site Setting (OSI, 2022)

The area surrounding the site is characterized as low-lying gently sloping land. The orientation of the local landscape slopes from a high point to the south-west of the site (spot height 98 m OD) towards the River Funshion 1.2km north-east of the site, which is at an elevation of approximately 50 mOD.

The site is surrounded by lands, which are primarily used for agricultural activities. According to the EPA Corine Landuse Map 2006, landuse in the area has been classified as 'non-irrigated land'.

There are a number of domestic residences in the vicinity of the site, mainly one-off housing along public roads; and some associated with farm holdings. The closest occupied dwelling house to the quarry is approximately 450 m from the north-eastern boundary of the quarry.

9.3.2 PROPOSED DEVELOPMENT

The existing quarry site extracts limestone as a principal activity. The current permitted extraction area is approximately 2.923 ha, including berms. The extraction depth is to 64 mOD. As of June 2022, the quarry has fully extracted the stone to 64 mOD along the eastern and northern boundaries of the permitted quarry area. Extraction is continuing along the western boundary towards the southern boundary.

A controlled explosive blast is used to fracture and dislodge limestone into pieces that can be worked by loading machinery and a crusher operating in the base of the quarry. The crushed material is brought to the surface for onward dispatch to customers. The crushed rock is processed to produce aggregates, 806/804 grade fill material and crushed stone for processing in a nearby lime plant. There is no dewatering required onsite, as all extraction takes place above the water table.

The applicant, Denis O'Keeffe (Rockmills Quarry), is requesting a 10 year planning permission for a 3.84 hectare net extension of an existing quarrying operation and all ancillary site works in the townlands of Carrigdownane Upper and Lisnagooreen, Co. Cork.

A site location map for the development is provided in Attachment 2.1 of this EIAR.

A site layout map for the development is provided in Attachment 2.2 of this EIAR.

There are no proposed amendments to the current buildings, facilities, inputs, processes or outputs at the existing quarrying activity as part of this application, other than the proposed extension of the activity boundary and extraction areas.

The proposed development would be a continuation of the current quarrying activity and there will be no intensification of the existing operations.

The proposed extension would continue to extract stone to a depth of 64m AOD.

The total proposed extension area is 4.21 ha, which includes proposed earth berms and boundaries.

The volume of stone within the proposed 3.84Ha net extraction excluding boundary earth berm areas, have been estimated to be 611,400 m^3. At an estimated density of 1.8 tonnes / m^3, this would equate to an estimated reserve of 1.106 million tonnes.

The quarrying excavation operation would progress in a single phase . continuing the extraction process in a westerly direction from the existing quarry boundary.

9.4 LAND & SOIL

9.4.1 SOIL & SUBSOIL

The Teagasc/EPA soils map (2006), describes the soils underlying the site as Deep Well-drained Mineral Soils derived from mainly Acidic Materials (AminDW). These soil types are of high agricultural potential and dominate the area. The well drained, highly fertile acidic mineral soils support the regions intensive dairy and market gardening industries.

The GSI Subsoil map describes the subsoil at the site as moderately permeable Till Derived from Devonian Sandstone (TDSs). Groundwater monitoring well drilling confirmed the GSI subsoil mapping. A localised pocket of gravel is mapped to the east of the existing quarry, along the access road (GSI, 2022). The subsoil mapping is shown in **Figure 9.2**.

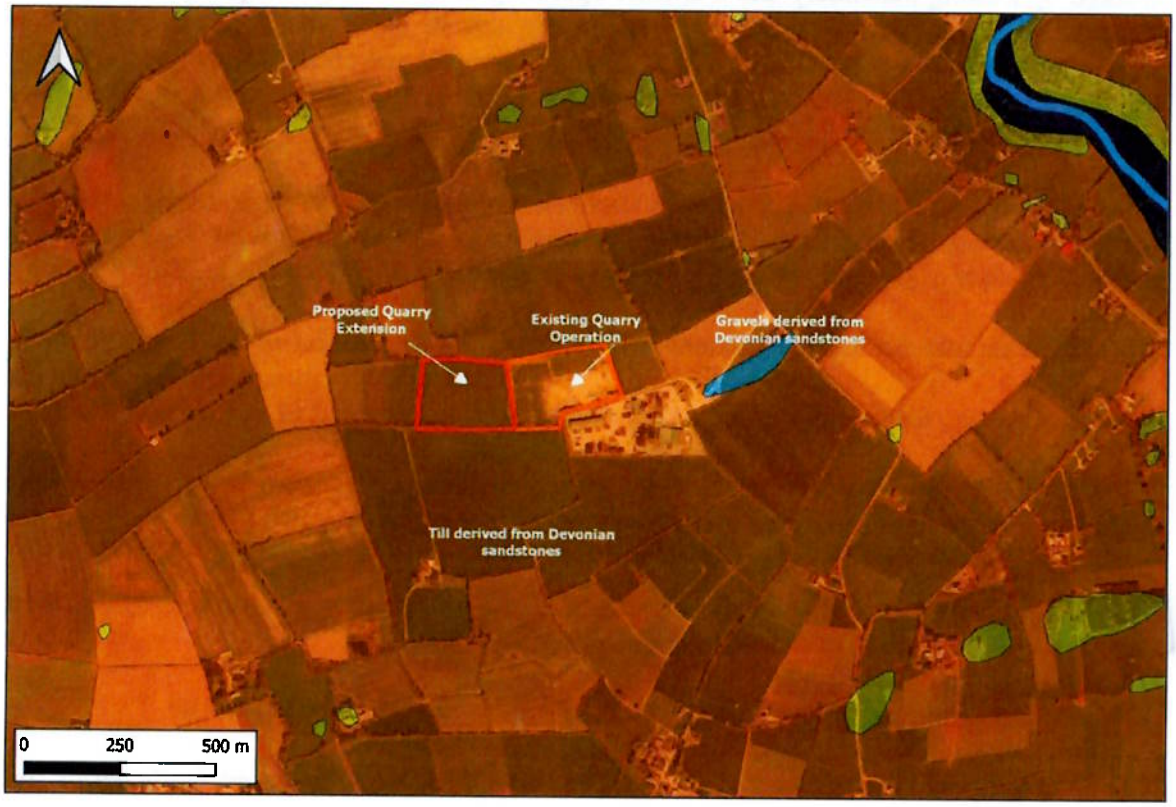

Figure 9.2: Subsoil (GSI, 2022)

The depth to bedrock in the area of the existing quarry was on average 1 m below ground level. The depth to bedrock in the proposed extension area is <3 m, according to the quarry staff onsite. Subsoil was noted to be deeper along the northern portion of the existing quarry, when stripping back was taking place.

The proposed extension area was previously in use as an agricultural field, where cattle were grazed or crops were grown. Therefore, it is not anticipated that the soil or subsoil is contaminated with any hazardous substances.

9.4.2 BEDROCK GEOLOGY

Reference to the 1:100,000 scale map of the Geology of East Cork-Waterford (Sheet 22) (Geological Survey of Ireland, 1996) indicated that the entire quarry site is underlain by the **Waulsortian Limestone Formation**. This comprises massive unbedded mud-limestone.

According to the GSI online maps, no fault systems have been identified within the immediate vicinity of the site. The closest mapped fault is c. 2.1 km south and east of the site. During the site walk over several east-west striking faults were noted on the quarry face.

The Waulsortian Limestone is represented on the GSI's Generalised Bedrock Map as Dinantian Pure Bedded Limestones (DPBL). Groundwater monitoring well drilling confirmed the bedrock mapping, with competent limestone logged during drilling.

The Waulsortian Limestone bedrock, as observed on the quarry face is shown in **Figure 9.3**.

The regional bedrock geology mapping is shown in **Figure 9.4**.

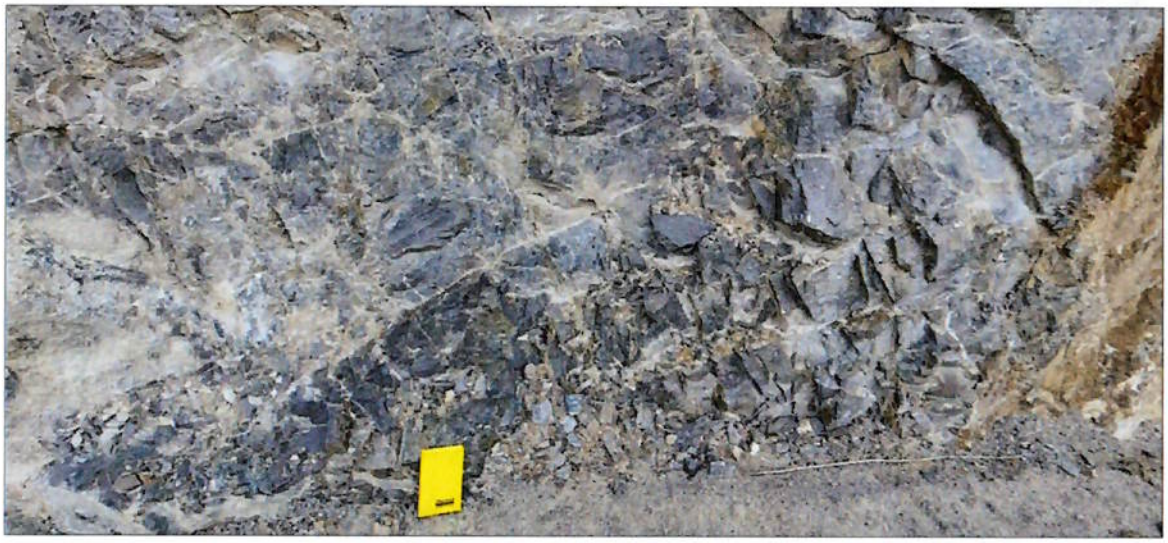

Figure 9.3: Waulsortian Limestone Bedrock

The GSI Mineral Database was reviewed, and it holds records for a mineral site within 2 km of the proposed development. The site is located at Lisnagorneen c. 1.20 km south of the proposed extension area. The mineral locality is listed as an outcrop of ''grey, crystalline limestone, which is full of white fossils'' (GSI, 2022). No extraction is reported at this site.

There are no proposed or designated geological heritage sites on or within 2 km of the proposed extension area (GSI, 2022).

The GSI Landslide Database was consulted. There are no records of historical landslides on or within 2 km of the proposed development site. The site is located within an area designated as ''low susceptibility'' to landside events. This is supported by relatively gently sloping and flat landscape of the wider area (GSI, 2022).

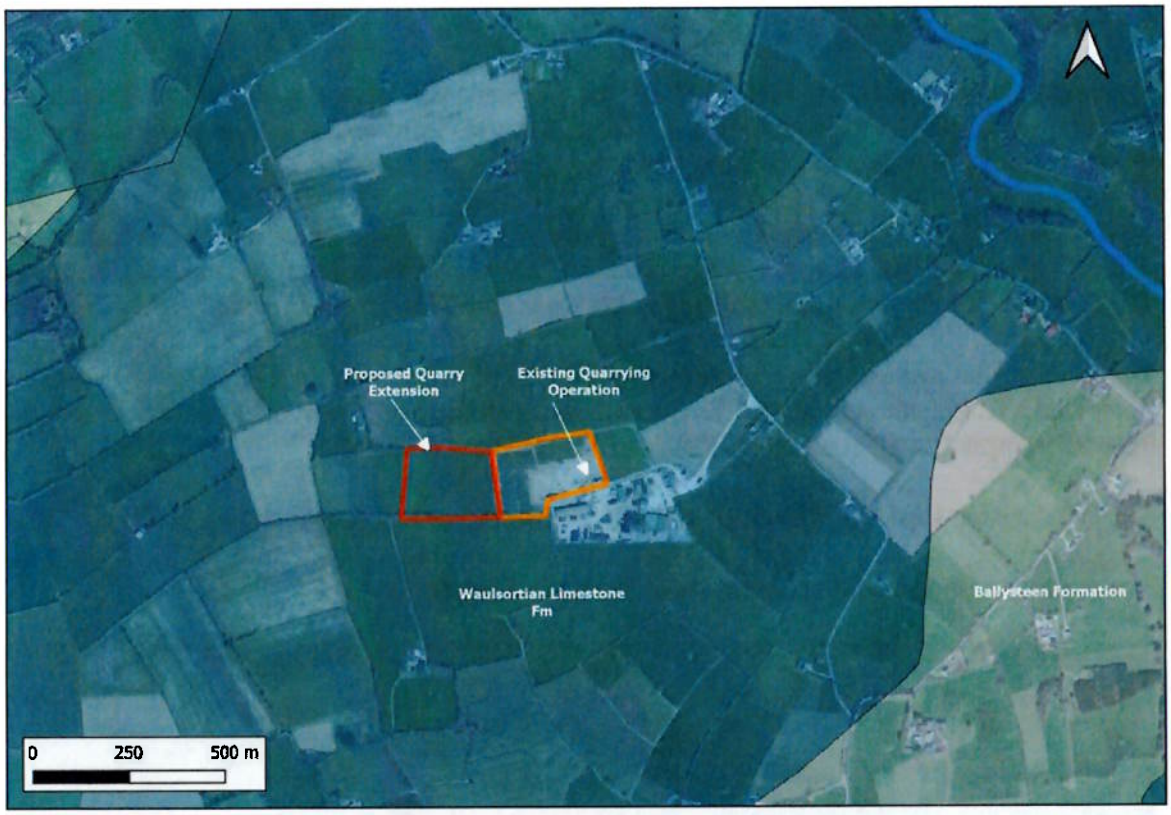

Figure 9.4: Bedrock Geology (GSI, 2022)

9.4.3 LAND & SOIL – SUMMARY OF FEATURES OF IMPORTANCE

The main land and soil features are classified as shown in **Table 9.4** in terms of their importance using the criteria as discussed above in **section 9.2.3**.

Table 9.4: Land & Soil – Features of Importance

Feature	Importance	Justification
Deep Well-drained Mineral Soils	Very High	Highly productive, deep, well drained, good quality agricultural soil which is important nationally
Waulsortian Limestone	High	Bedrock geology is considered to be of high economic importance in terms of its value to the construction sector and agricultural sector

9.5 HYDROGEOLOGY

9.5.1 AQUIFERS

Regionally, the site is located within the Mitchelstown Groundwater Body (GWB). The Waulsortian Limestone beneath the site is characterised by the GSI as a **Regionally Important Karstified Aquifer**. The flow system is described as diffuse, with groundwater flows along open structures within the bedrock, such as fissures, joints and bedding planes. The aquifer mapping is shown in **Figure 9.5**.

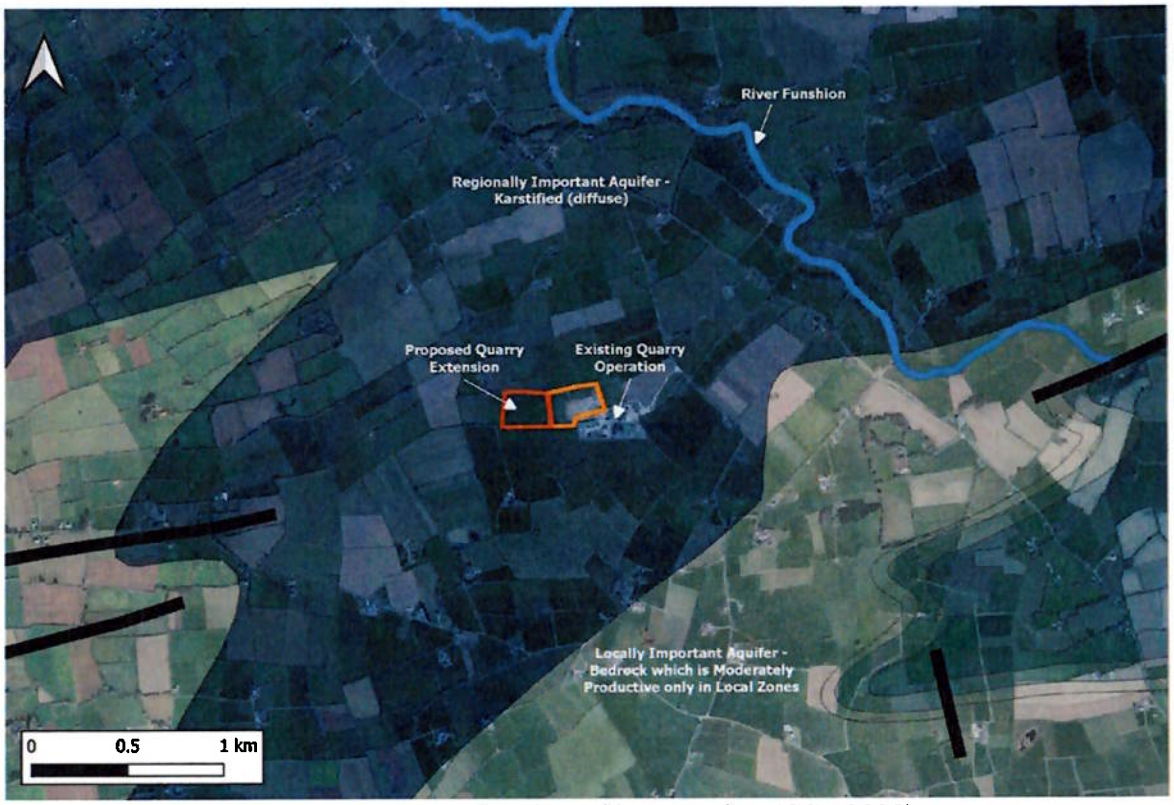

Figure 9.5: Regional Aquifer Mapping (GSI, 2022).

Regionally important aquifers are defined as a bedrock aquifer unit which is capable of supplying abstractions of regional importance (e.g. large public water supplies) or 'excellent' yields (>400 m^3/d) (GSI, 2017).

The key characteristics of the Mitchelstown GWB are as follows:

- There is widespread karstification throughout the GWB, which has led to the rock head having an irregular surface whereby the depth to subsoil's is often variable over a short distance.
- The main recharge mechanisms are diffuse percolation through subsoil and to a lesser extent direct recharge through swallow holes and collapse features.
- Groundwater discharges to large springs and rivers/streams within the GWB.

- The groundwater in the GWB is dominated by calcium and bicarbonate ions. Electrical conductivity values can vary greatly and lower values suggest shorter residence times for groundwater in the aquifer.
- There is a high level of interaction between groundwater and surface water, and as a consequence microbial pollution can travel quickly into the groundwater system.
- The groundwater body is unconfined.
- Groundwater flow paths can be several kilometres long, but may be shorter in areas where the water table is close to the surface.
- These rocks have no intergranular permeability; and therefore all groundwater flow occurs in fractures and faults. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones.
- Permeability is highest in the upper few metres but generally decreases rapidly with depth.
- It is likely that some conduit flow does occur in the GWB, where karstification has enlarged zones of weakness, such as along structures e.g. faults, joints or bedding.

The GSI Recharge Mapping shows the site is located in a 2.v Hydrogeological Setting, which consists of moderate permeability subsoil overlain by well-drained soil in an area of high groundwater vulnerability. The GSI has assigned a recharge coefficient of 60% to the subsoil overlying bedrock in the proposed extension area (GSI, 2022).

9.5.2 GROUNDWATER LEVELS & FLOW DIRECTION

There is no connection to the mains water supply for the quarry activity. All water for the site is sourced from groundwater wells, GW1 and GW2. Water is stored in a single 30 m^3 stainless steel buffer tank. There is no water treatment carried out at the site, but wells undergo regular testing. GW1 is the primary groundwater supply, while GW2 provides back up supply. Water is used for dust suppression, 806 grade fill wetting, quarry office drinking water and quarry office toilets.

The two wells are positioned to the east of the proposed extension area. The geology encountered during the monitoring well drilling is summarised in **Table 9.5**.

The wells are screened to target flow in the upper section of the limestone bedrock aquifer. Murphy McCarthy/Rockmills Quarry complete regular dipping of the groundwater level in GW1 and GW2.

The limited set of water level data shows that water levels are highest in the winter months of December/January and lowest during the summer months of June/July. The maximum recorded groundwater level to date was 62.93 mOD at GW2 in January 2021. The proposed extension would continue to extract limestone to a depth of 64 mOD.

GW1 was reported to be ''dry'' in August, September and October of 2019; and in July/August 2020. This is likely due to the shallow nature of GW1. When GW1 is dry, water for onsite operations is sourced from GW2.

On site measurements of groundwater levels indicates the groundwater flow direction is to the east or east north-east towards the River Funshion. Groundwater will discharge to the River

Funshion as baseflow. The groundwater flow mechanism is described as ''diffuse'' and is structurally controlled, along bedding plants, joints, faults and fractures.

Table 9.5: Groundwater Monitoring Network

Parameter	GW1	GW2
Drill Date	29th May 2014	30th May 2014
Position	Southern Boundary	Northern Boundary
Hydraulic Position	Down Hydraulic Gradient	Down Hydraulic Gradient
Datum	75.01 mOD	79.85 mOD
Depth	25.25 mgbl	34.17 mbgl
Water Strikes	22.9 m water bearing fissure	34 m water bearing fissure
Geology	0.00 – 3.60 m Boulder Clay 3.60 - 25.25 m Competent Limestone	0.00 – 10.70 m Boulder Clay 10.70 – 18.30 m Very Weathered Limestone 18.30 – 34.17 m Very Competent Limestone
Screened Section	6.00 – 25.25 m	18.30 – 34.17 m
Purpose	Primary Production Well & Monitoring Well	Standby Production Well & Monitoring Well
MBGL – Meters Below Ground Level		

The position of the wells and groundwater flow direction is shown in **Figure 9.6**.

The water level data is shown on **Figure 9.7**.

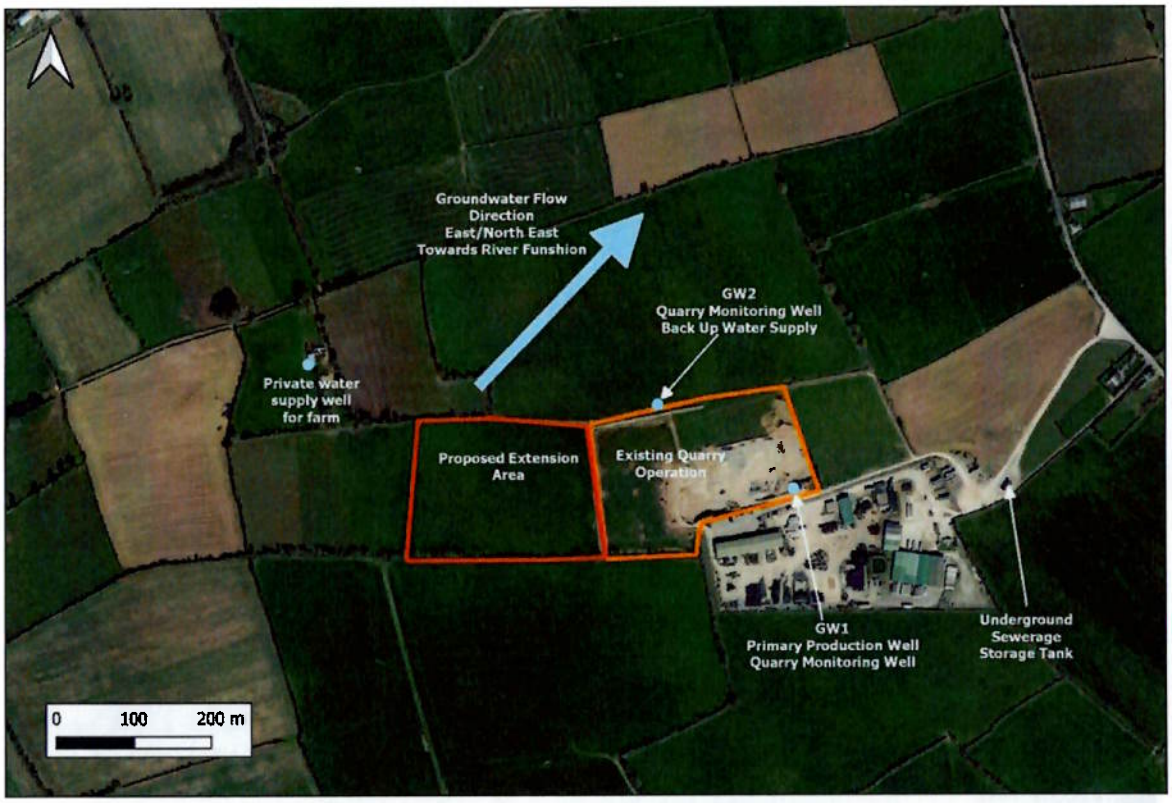

Figure 9.6: Groundwater Flow Direction

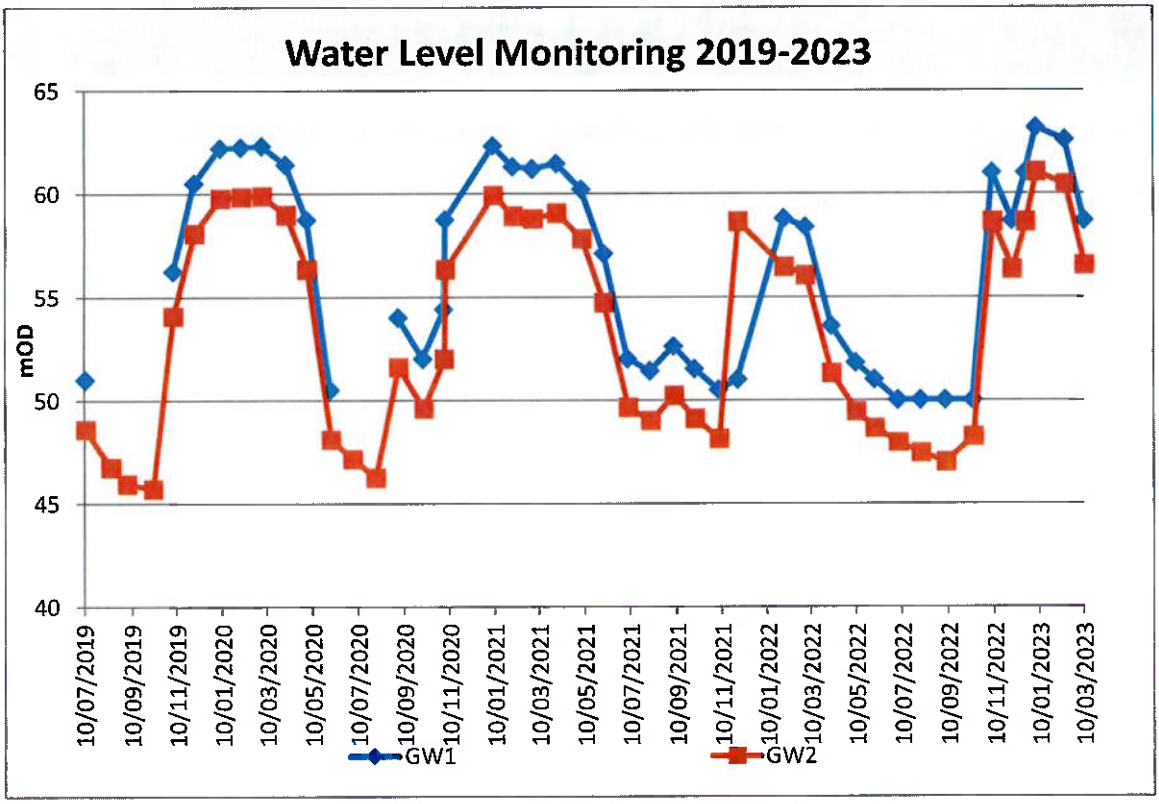

Figure 9.7: Water Level Monitoring

9.5.3 KARST

Karst forms in carbonate bedrock, such as limestone where rainwater, which is slightly acidic dissolves the bedrock over time. The dissolution of the limestone bedrock results in unique features such as swallow holes, caves or enclosed depressions. The north Cork area is known to be an active karst area.

The GSI Karst Database was reviewed, and the findings are outlined in **Table 9.6**.

The GSI Karst Mapping for the wider area is shown in **Figure 9.8**.

Table 9.6: Karst Features (GSI, 2022)

GSI ID	Feature	Townland	Distance from Site
1709NWK001	Enclosed Depression	Ballynahalisk	<0.60 km from site NW
ID Not Assigned by GSI	Enclosed Depression	Lisnagourneen	1.33 km SW
ID Not Assigned by GSI	Kearney's Spring	Ballyvoddy	1.53 km N
1709NWK00	Cave	Corbaley	2.03 km S

The quarry staff informed IE Consulting that no swallow holes or cavities were encountered during the quarrying operations to date. There are no karst features present on the proposed quarry extension site. However, local knowledge suggests that the area is dynamic, with localised, small swallow holes known to occur in agricultural fields in the wider area.

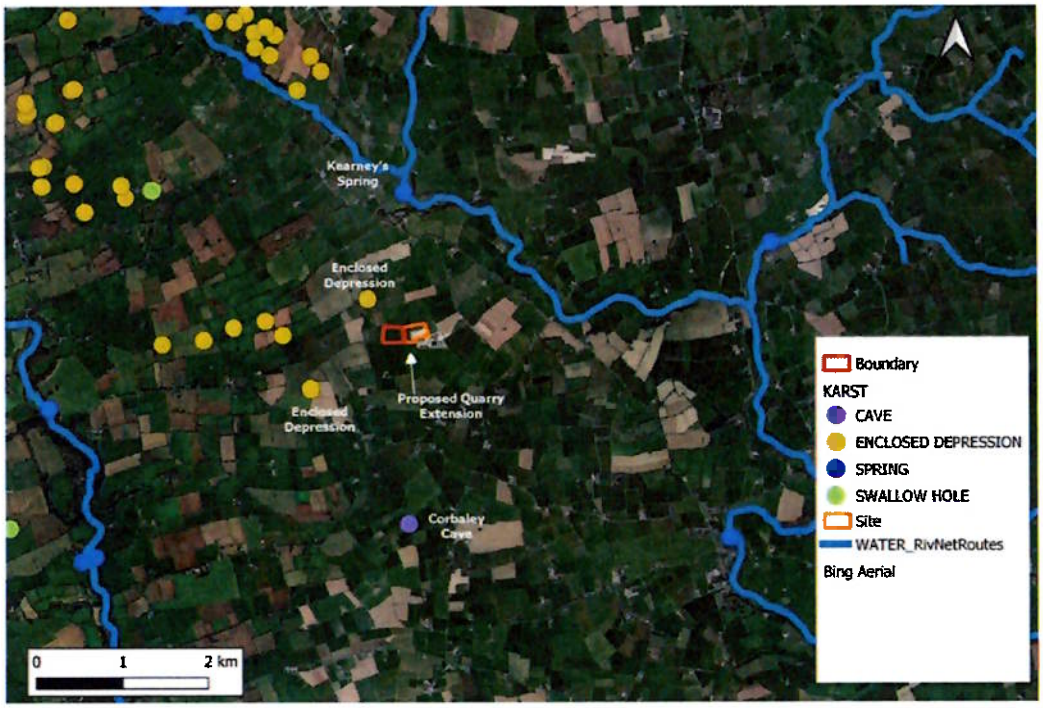

Figure 9.8: Karst Features

9.5.4 GROUNDWATER VULNERABILITY

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer's intrinsic geological and hydrogeological characteristics.

The GSI uses five groundwater vulnerability categories - Extreme rock at or near surface or karst (X), Extreme (E), High (H), Moderate (M) and Low (L) - for mapping purposes and in the assessment of risk to groundwater. The classifications are based on the thickness and permeability of the subsoil's overlying the aquifer.

The GSI groundwater vulnerability classification scheme is outlined in **Table 9.7**.

The groundwater vulnerability mapping for the wider area is shown in **Figure 9.9**.

Table 9.7: Groundwater Vulnerability Classification

Depth to Rock	Hydrogeological Requirements for Groundwater Vulnerability				
	Diffuse Recharge			Recharge Point	Unsaturated Zone
	High Permeability *(sand/gravel)*	Moderate Permeability *(sandy subsoil)*	Low Permeability *(clayey subsoil, clay, peat)*	*(swallow holes, loosing streams)*	*(sand & gravel aquifers only)*
0-3 m	Extreme	Extreme	Extreme	Extreme (30 m radius)	Extreme
3 – 5 m	High	High	High	N/A	High
5 – 10 m	High	High	Moderate	N/A	High
>10 m	High	Moderate	Low	N/A	High

i. N/A = not applicable.
ii. Release point of contaminants is assumed to be 1 – 2 m below ground surface.
iii. Permeability classifications relate to the engineering behaviour as described by BS5930.
iv. Outcrop and shallow subsoil (i.e. generally <1.0 m) areas are shown as sub-category of extreme vulnerability.
(amended from Deakin and Daly (1999) and DELG/EPA/GSI (1999)

The GSI groundwater vulnerability mapping shows the proposed extension area is classified as high vulnerability.

Groundwater monitoring well drilling records show, that 3.60 m of boulder clay was encountered in GW1; which confirms the high vulnerability mapping.

Drilling records show that 10.70 m of boulder clay was reported at GW2, which suggests that the groundwater vulnerability is on the border between high to moderate vulnerability in the northern portion of the existing site.

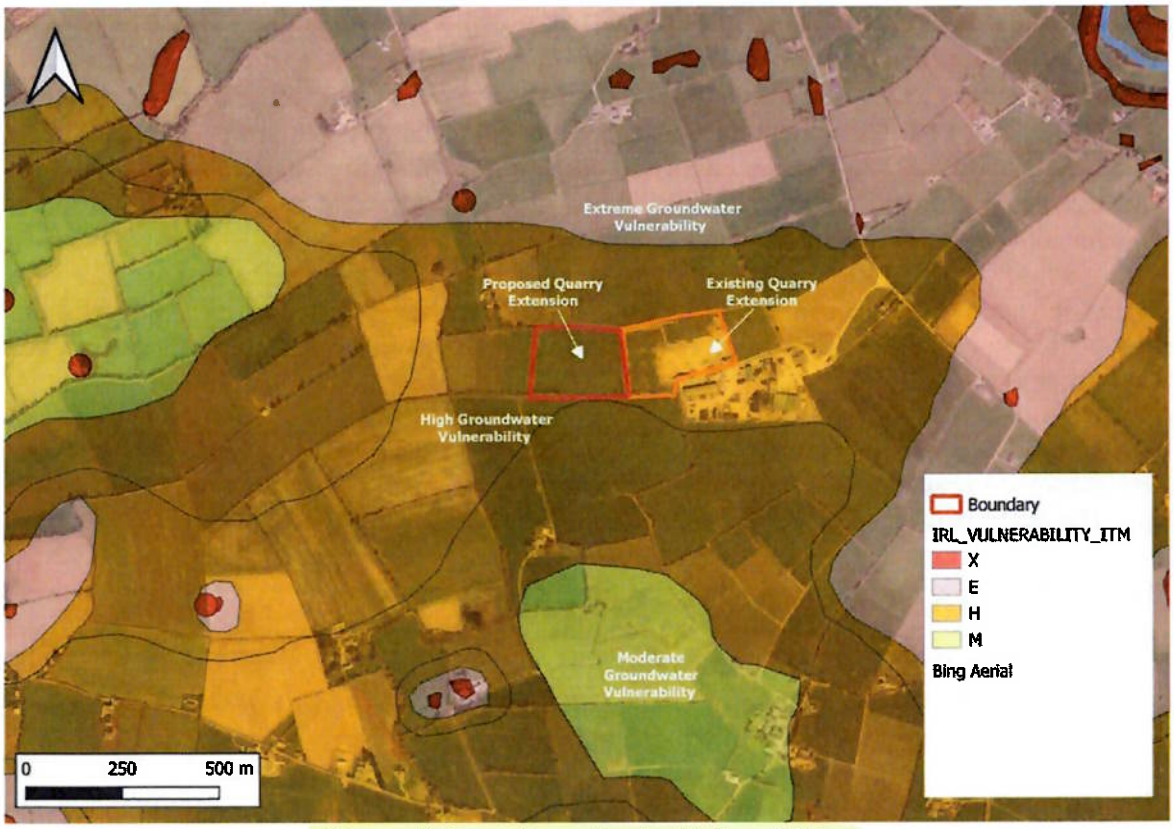

Figure 9.9: Groundwater Vulnerability

The GSI groundwater vulnerability mapping shows the proposed extension area is classified as high vulnerability.

Groundwater monitoring well drilling records show, that 3.60 m of boulder clay was encountered in GW1; which confirms the high vulnerability mapping.

Drilling records show that 10.70 m of boulder clay was reported at GW2, which suggests that the groundwater vulnerability is on the border between high to moderate vulnerability in the northern portion of the existing site.

9.5.5 GROUNDWATER HYDROCHEMISTRY

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least 'good quantitative status' and 'good chemical status' by 2015, as well as preventing deterioration in those waters that have been classified as 'good' status. Groundwater has just two statuses – Good and Poor.

The regional groundwater body status was obtained from the EPA Catchments portal. The Mitchelstown GWB was assigned a ''poor'' status for the 2013-2018 monitoring period. The GWB body failed the WFD assessment on its chemical status, due to elevated nitrate concentrations. The quantitative status of the GWB was classified as ''good''.

The Mitchelstown GWB is deemed to be ''at risk'' of not achieving good status in the next WFD monitoring period.

In addition, the EPA Catchments unit lists pressures that the GWB's are experiencing. The Mitchelstown GWB has been assigned agriculture, forestry and ''other unknown anthropogenic sources'' as significant pressures in the most recent assessment by the EPA Catchment Science & Management Unit.

While it is important to consider the regional status of the GWB, the local groundwater hydrochemistry within the immediate area of the quarry is more relevant for the purpose of this assessment.

The quarry operator engaged BHP Laboratories, Limerick to visit the site and collect samples from GW1. The samples are collected by an environmental technician from a raw water sample tap. The analysis is completed at the BHP Laboratory which is INAB accredited.

The results were compared to the following groundwater regulations:

- S.I. No. 366/2016 - European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016.
- EPA, 2003. *Towards Setting Guideline Values for the Protection of Groundwater in Ireland* – Interim Report. Environmental Protection Agency

The groundwater quality results from GW1, the upgradient groundwater monitoring point, are summarised in **Table 9.8**.

Table 9.8: Groundwater Quality

Parameter	EPA, 2003	SI366/2016	Units	GW1 07/09/2021	GW1 02/03/2022	GW1 01/02/2023	GW1 05/04/2023
Ammonia as NH_3-N	0.065	0.12	mg/l	<0.02	<0.129	<0.129	<0.129
Nitrate as NO_3	25	37.5	mg/l	36.7	47	40	37
Chloride	30	24.5	mg/l	13.4	15	32	31
Potassium	5	-	mg/l	0.522	<5	<5	<5
Sodium	150	-	mg/l	6.92	<10	18	17
Orthophosphate as P	0.03	0.035	mg/l	<0.02	<0.065	<0.2	<0.065
Total Coliforms	0	-	CFU/100 ml	0	0	0	0
Faecal Coliforms	0	-	CFU/100 ml	0	0	0	0
Entercoccoi	0	-	MPN/100 ml	0	0	0	0

The analysis indicates good groundwater quality. The nitrate concentration is reported above the 25 mg/l EPA IGV, but below the 50 mg/l MAC as set out in the drinking water standards (SI122/2014). The elevated nitrate is attributed to the intensive agriculture (dairy, market gardening) of the wider area. Elevated nitrate is unlikely to be associated with blasting as it takes place infrequently on the site. However the groundwater quality of the wider area is known to have elevated nitrate concentrations due to the intensive dairy farming in the River Funshion catchment.

The potassium – sodium ratio was calculated for GW1, using data from September 2019. The September 2019 data is considered more accurate, due to the lower laboratory limit of detection employed in the analysis.

A potassium - sodium ratio of <0.40 is considered to represent good groundwater quality. A ratio of >0.40 indicates contamination from organic wastes such as septic tanks, soiled farm yard runoff or slurry spreading.

A ratio of 0.08 was calculated for GW1, which suggests good water quality.

9.5.6 GROUNDWATER RESOURCES

A well survey was conducted by IE Consulting and Rockmills Quarry Ltd to identify all wells in the area surrounding the proposed development. The survey consisted of a desk based review of abstractions listed on the GSI Spatial Resources Viewer and door to door enquiries.

Groundwater abstractions used for public supply have Source Protection Plans prepared by the GSI and EPA to define the groundwater Zone of Contribution (ZOC) for large public water supplies. A ZOC is the land area that contributes water to the well or spring. The GSI ZOC Database was reviewed, and the ZOCs in the wider area are shown in **Figure 9.10** and summarised in **Table 9.9**.

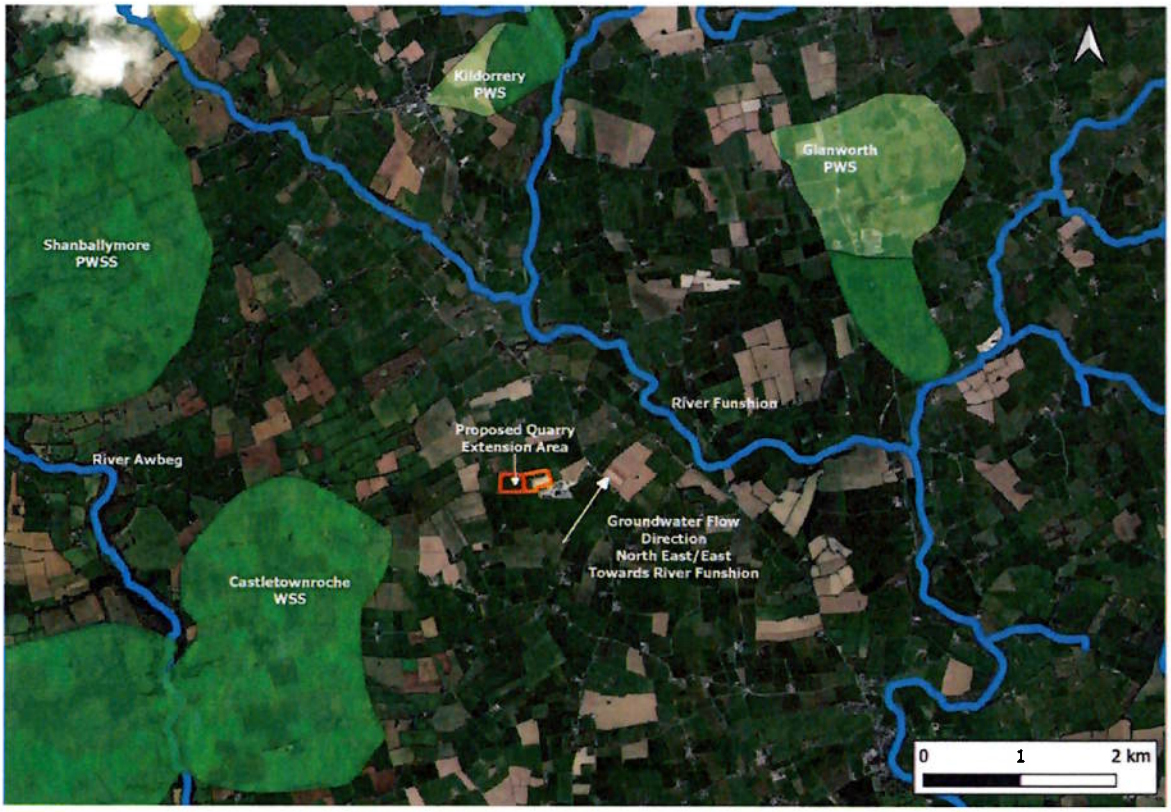

Figure 9.10: Zones of Contribution

Table 9.9: Public Water Supply Schemes

ZOC	Population Served	Distance from Site	Screen In/Out	Justification
Castletownroche WSS	1600	1.36 km W	Out	Up hydraulic gradient – Screen Out
Shanballymore PWSS	3000	3.86 km NW	Out	Up hydraulic gradient – Screen Out
Kildorrery PWS	800	8.82 km N	Out	Screen out due to distance
Glanworth PWS	Not Listed in GSI ZOC Report	3.38 km E	Out	Screen out due to distance East of River Funshion / groundwater discharge zone

The proposed quarry development poses no risk to the ZOCs identified, largely due to their hydraulic position and/or distance from the proposed quarry extension.

The GSI Well & Spring Database was consulted. Registration of abstractions is not mandatory with the GSI, and therefore the database may represent an incomplete inventory of all abstractions in the area.

The list of records for wells and springs in the GSI Database for the Carrigdownhane Upper area are outlined in **Table 9.10**.

The location of the GSI Well & Spring records are shown in **Figure 9.11**.

Table 9.10: GSI Well & Spring Database

GSI ID	Type	Use	Distance from Site	Screen In/Out	Justification
1709NWW015	Spring	Not Stated	1.16 km SE	Out	Side Gradient
1709NWW014	Spring	Not Stated	1.16 km SE	Out	Side Gradient
1709NWW016	Borehole	Not Stated	2.06 km SE	Out	Side Gradient

The wells listed in the GSI Well & Spring Database have been screened out of the risk assessment, due to their hydraulic position in relation to the proposed development.

IE Consulting understands that the Irish Water mains network is widespread in the area. One well was identified from discussions with the quarry staff, which is located c. 170 m North West of the proposed western boundary of the extension area. The well is used for agricultural purposes only, and supplies a farm which is used for grazing cattle. The location of this private

well is shown on **Figure 9.6**. The private well identified is considered to be side hydraulic gradient of the proposed development.

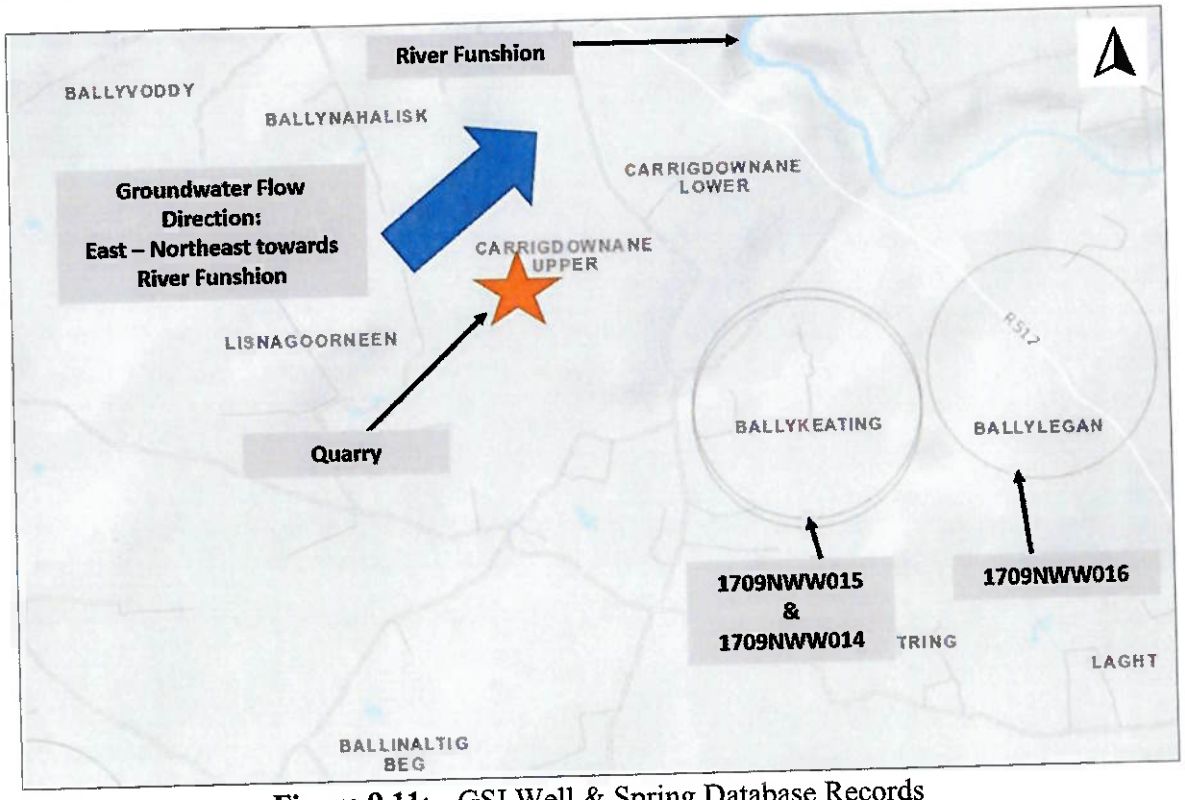

Figure 9.11: GSI Well & Spring Database Records

9.5.7 HYDROGEOLOGY – SUMMARY OF FEATURES OF IMPORTANCE

The main hydrogeological features are classified in terms of their importance in **Table 9.11**.

Table 9.11: Hydrogeology – Features of Importance

Feature	Importance	Justification
Regionally Important Aquifer	Very High	Regionally important aquifer which supplies many public water schemes such as the villages of Castletownroche, Glanworth, Kildorrery and Shanballymore and surrounding townlands.
Karst Features	Low	Karst features are abundant throughout the north Cork landscape. Low value on a local scale

The geological/hydrogeological environment has been classified as a Type B - Naturally dynamic geological/hydrogeological environment. This is due to the presence of a regionally important aquifer underlying the site and the presence of karst in the wider area. The site is not considered to be sensitive in terms of its proximity/hydraulic position in relation to source protection zones.

9.6 HYDROLOGY

9.6.1 REGIONAL & LOCAL HYDROLOGY

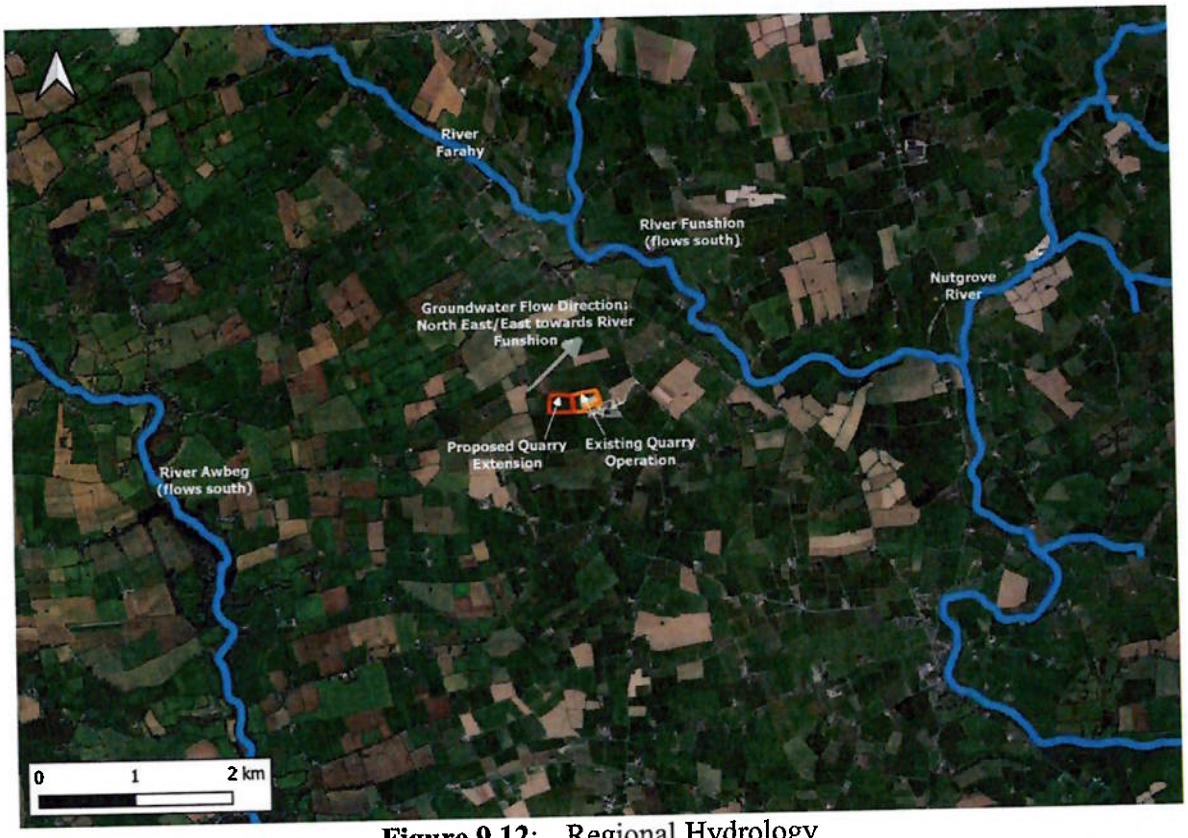

Figure 9.12: Regional Hydrology

The existing quarry and proposed extension area are located within the Blackwater (Munster) Catchment (HA: 18). The site is located with the WFD sub-catchment known as the Funshion (SC_020).

The sub-catchment boundary/watershed between the Funshion sub-catchment SC_(020) and Blackwater [Munster] sub-catchment (SC_100) is located c. 150 m from the proposed quarry extension area.

The River Funshion (IE_SW_18F050700) is located c. 1.20 km to the North East of the existing quarry. The River Awbeg [Buttevant] (IE_SW_18A051300) is located c. 4.00 km to the west of the existing quarry.
The River Funshion rises in the Galtee Mountains at Kilbehenny, near the Limerick–Tipperary border and flows southwards through the towns of Mitchelstown, Kildorrery, Rockmills and Glanworth before discharging to the River Blackwater south of the town of Fermoy.

The River Funshion is not classified as a salmonid watercourse or a nutrient sensitive water course.

The River Blackwater is classified as a designated salmonid watercourse and a nutrient sensitive river.

The proposed development does not contain any natural watercourses. There are no drains, ponds or artificial water courses in the proposed extension area.

The regional hydrological mapping is shown in **Figure 9.12**.

9.6.2 FLOOD RISK IDENTIFICATION

A basic flood risk screening assessment, appropriate to the type and scale of development proposed was completed by a hydrologist from IE Consulting.

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA flood map number 2019/MAP/83/A illustrates indicative flood zones within this area of County Cork. The PFRA flood mapping indicates no areas of indicative fluvial (river), pluvial (rainfall) or groundwater flooding mapped within the boundary of the proposed development site. The PFRA mapping is shown in **Figure 9.13**.

It should be noted that the indicated extent of flooding illustrated on these maps was developed using a low resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site specific basis.

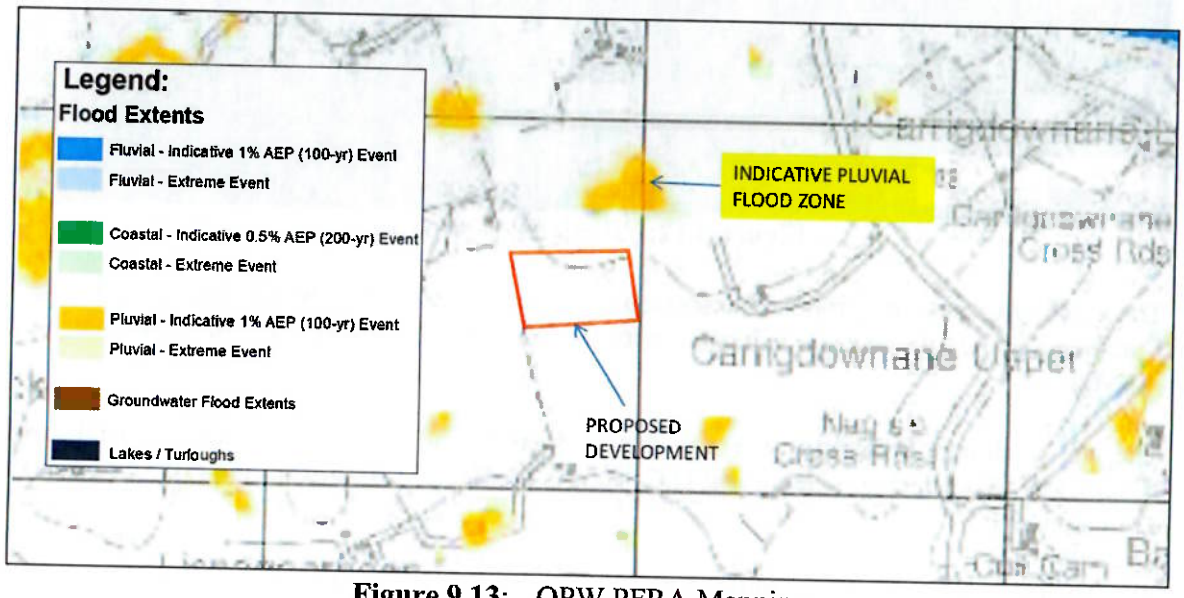

Figure 9.13: OPW PFRA Mapping

The OPW Flood Maps Website (www.floodinfo.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. There are no recorded or anecdotal instances of flooding at or in the immediate vicinity of the proposed development site. These records were confirmed through discussions with the site operatives during the IE Consulting site walk over.

The National Indicative Fluvial Flood Mapping (NIFM) as acquired from the OPW Floodinfo.ie resource was utilised to assess the potential present day fluvial flood extents at the location of the proposed development site. The assessment indicates that the site boundary does not fall within a 0.1% AEP (1 in 1000 year) present day scenario fluvial flood zone.

It should be noted that the proposed development site is located on elevated land approximately 30 m above the River Funshion, which offers protection from a potential flood event. Overall, the potential flood risk to the proposed development site from an extreme fluvial flood event from the River Funshion is considered to be low.

9.6.3 HYDROMETEOROLOGY

The closest synoptic station to the proposed development site is Teagasc Moore Park, Fermoy, Co. Cork located c. 15 km to the south east of the site. Long term average rainfall, temperature and evaporation data was sourced from Met Eireann. The long-term-average (LTA) reference period is 1981-2010. The climate data is outlined in **Table 9.12**.

Table 9.12: Climate Data

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Rainfall (mm)	111.0	80.1	85.5	65.6	69.3	70.2	62.0	83.6	79.5	113.3	105.4	103.9	1029.4
Temperature (°C)	5.7	5.8	6.9	8.6	11.0	13.8	15.8	15.3	13.1	10.4	7.7	5.8	10.0
PE (mm) #	8.8	19.2	31.5	56.3	71.2	84.8	92.3	68.3	41.4	24.4	11.6	10.2	519.4

PE – Potential Evapotranspiration
2021 data as LTA data unavailable for Moore Park

The rainfall data shows that October is the wettest month, while July is the driest month. Long term average temperature data shows that January is the coolest month, while July is the warmest month.

The effective rainfall represents the water available for runoff and recharge to groundwater via infiltration through the subsoil/bedrock onsite. The portion of water which infiltrates to the aquifer is determined by the recharge coefficient. The GSI has assigned a recharge coefficient of 60% to the till overlying the bedrock aquifer.

A simple water balance was completed for the site, using the climate data obtained from Met Eireann.

Site Water Balance

Annual Average Rainfall (AAR) = 1029.4 mm
Potential Evapotranspiration (PE) = 519.4 mm
Actual Evapotranspiration (AE) = 4.93 mm (taken as 95% of PE)

Effective rainfall = AAR – AE
Effective rainfall = 1029.4 – 4.93
Effective rainfall = 1024.47 mm

GSI Recharge Coefficient (Rc) = 60%

Groundwater recharge = EF x Rc
Groundwater recharge = 1024.47 x 0.60
Groundwater recharge = 614 mm/yr

A groundwater recharge rate of 614mm/yr suggests that the underlying bedrock aquifer receives a large volume of recharge, and the site/surrounding area has a low surface water runoff rate (410 mm/yr). The moderate permeability subsoil overlain by well-drained soil in an area of high groundwater vulnerability allows the infiltration of rainfall into the subsoil and down into the bedrock aquifer.

Following the removal of subsoil and the quarrying of the upper portion of the bedrock, the recharge rate will increase. This is due to direct recharge through the quarry floor. Therefore, the 614 mm/yr is likely to be an underestimation for the footprint of the quarried area.

Note: *This is a simple water balance for determining the baseline hydrological characteristics of the site. There is no runoff from the existing quarry and all rainfall which falls on the footprint of the existing quarry infiltrates into the aquifer.*

9.6.4 SURFACE WATER HYDROCHEMISTRY

The EU Water Framework Directive (WFD) aims to improve water quality across all EU member states. Surface water features such as rivers, lakes, estuaries and coastal waters are assigned one of five categories of status, based on the results of a chemical and ecological assessment. The five category statuses are as follows: High (top rank); Good; Moderate; Poor; and Bad (lowest rank).

The River Funshion was assigned a 'good status'' for the 2013 – 2018 WFD monitoring period and is deemed to be ''at risk'' of not achieving good status in the next monitoring period. The EPA Catchment Management Unit has assigned agriculture as a significant pressure to the River Funshion sub-catchment.

The Funshion Catchment Management Group is noted to have an active presence in the catchment to tackle the significant pressures assigned following the most recent WFD assessment.

9.6.5 DESIGNATED SITES

Natura 2000 is a European network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types. Natura 2000 sites are designated as Special Areas of Conservation (SAC) or Special Areas of Protection (SPA). The NPWS Designations Viewer shows that there are no SAC's or SPA's mapped on or within 2 km of the site.

The Blackwater River (Cork/Waterford) SAC, which is mapped along the River Awbeg, is located c. 4.00 km to the west. It is unlikely, given the distance and groundwater flow direction, that there is any hydrological (surface water) or hydrogeological (groundwater) connectivity with the River Awbeg.

The River Funshion is located c. 1.20 km to the North East of the existing quarry. The River Funshion is not mapped as a designated site; however it does discharge to the River Blackwater c. 18 km to the South East, just east of the town of Fermoy.

The groundwater flow direction is towards the River Funshion to the North East. The River Funshion likely receives a large component of baseflow from the regionally important aquifer. Thus, there is a hydrogeological connection between the quarry site and the River Funshion.

There are several proposed Natural Heritage Areas (pNHA) located in the vicinity of the proposed development site. These are summarised in **Table 9.13**.

Table 9.13: Natural Heritage Areas

Site	Distance	Screen In/Out	Justification
Brown's Farm, Togher Cross Roads pNHA (001169)	1.00 km S	Screen Out	Up gradient of quarrying operations. No hydrogeological/hydrological connectivity with existing quarry or proposed extension area
Ballinaltig Beg Pond pNHA (001829)	1.89 km S	Screen Out	
Glanworth Ponds pNHA (000085)	2.80 km SE	Screen Out	
Ballindangan Marsh pNHA (000899)	4.35 km NE	Screen Out	Opposite side of groundwater discharge zone / River Funshion No hydrological/hydrogeological connectivity

In terms of an impact on the proposed NHA's from a water aspect, these sites have been screened out of the risk assessment. These sites are further discussed in **Section 8.0 - Biodiversity** of the EIAR. The location of the proposed NHA's are shown on **Figure 9.14**.

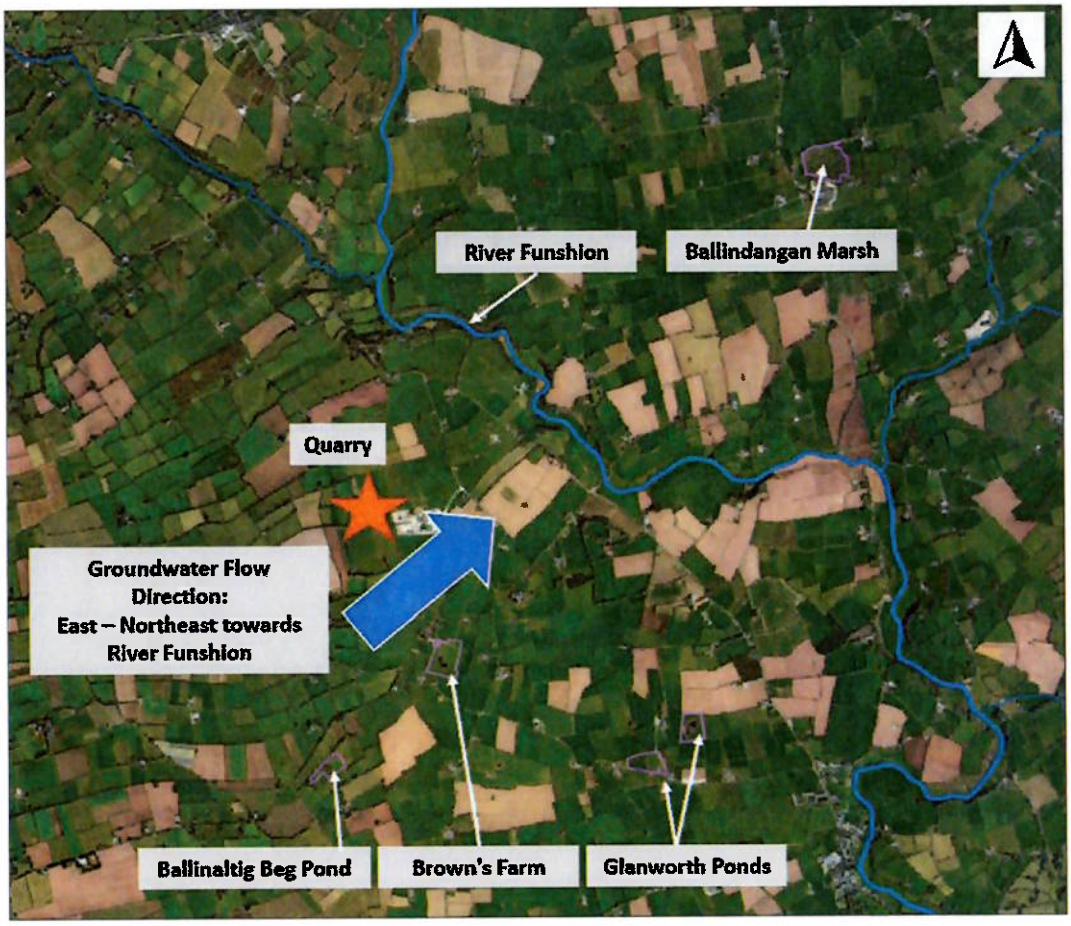

Figure 9.14: Proposed Natural Heritage Areas

9.6.6 HYDROLOGY – SENSITIVITY ASSESSMENT

The hydrological receptors have been classified based on their sensitivity, as outlined in **Table 9.14**.

Table 9.14: Hydrology Sensitivity Assessment

Feature	Sensitive	Screen In/Out	Justification
River Funshion	Sensitive	Screen In	Receptor is of medium environmental importance and of regional value. Salmonoid species may be present and there are likely locally important fish stocks in the river.
Blackwater River (Cork/Waterford) Special Area of Conservation	Not Sensitive	Screen Out	Receptor is of high environmental importance. Salmonoid spawning grounds present. To reach the SAC, any contaminants would need to pass through the unsaturated rock mass beneath the quarry, then travel 1.20 km to the Funshion River, then mix with the river flow and travel 18km downstream to the Blackwater. Whilst there is potential connectivity, the distances and convoluted pathway means that any risks associated with the connectivity will not be significant. In addition, any contaminant will be significantly attenuated due to dilution in the large water mass of the River Funshion. Therefore, the Blackwater River SAC has been screened out of the risk assessment

9.7 WATER MANAGEMENT WITHIN QUARRY

9.7.1 QUARRY WATER MANAGEMENT

All rainfall that falls within the footprint of the quarry infiltrates into the quarry floor and migrates vertically down to the water table. There is no runoff or discharge from the quarry.

The refueling area is paved, with all drainage directed to an oil-water interceptor. The oil-water interceptor is cleaned and inspected regularly. The oil-water inceptor discharges to a soakaway. Vehicle diesel is stored in three double-skinned Carbery Plastics 6 m^3 tanks, stored on a concrete plinth draining to the interceptor.

9.7.2 WATER SUPPLY

There is no connection to the mains water supply for the quarry activity. All water for the site is sourced from groundwater wells, GW1 and GW2. Water is stored in a single 30 m^3 stainless steel buffer tank. There is no water treatment carried out at the site, but wells undergo regular check testing. GW1 is the primary groundwater supply, while GW2 provides a backup supply. Water is used for dust suppression, 806 grade fill wetting, quarry office drinking water and quarry office toilets.

The water demand ranges from 1 m^3/d to 3 m^3/d throughout the year. In general, water use is highest in the summer/drier months when the need for dust suppression is at its greatest. The proposed extension will not increase the volume of water required in the day to day site operations.

9.7.3 WASTEWATER TREATMENT

There is no septic tank onsite. All wastewater generated from toilets and sinks (sewerage) on the site is directed to a subsurface concrete tank located adjacent to the weighbridge. The tank is emptied, when required, by a licensed contractor who removes all effluent offsite for safe disposal. The location of the tank is shown on **Figure 9.6**.

9.7.4 HISTORICAL OVER EXTRACTION

Historically, a small portion of the north eastern area of the existing quarry pit was excavated below the water table. This was not permitted in the planning permission for the site. The area of over excavation was backfilled with native crushed limestone rock and then covered over with 806 fill material to 65-66 mOD. The small area of over excavation was then surrounded by a 1 m high bund to prevent plant/HGVs accessing the area.

A hydrogeologist from IE Consulting reviewed the finished remediation works and was satisfied that the isolated area of over extraction was remediated and does not pose a risk to the groundwater beneath the site.

The backfilled area of over excavation is shown in **Figure 9.15**.

Figure 9.15: Backfilled Area of Historical Over Excavation

A conceptual site model for the proposed development is shown in **Figure 9.16**.

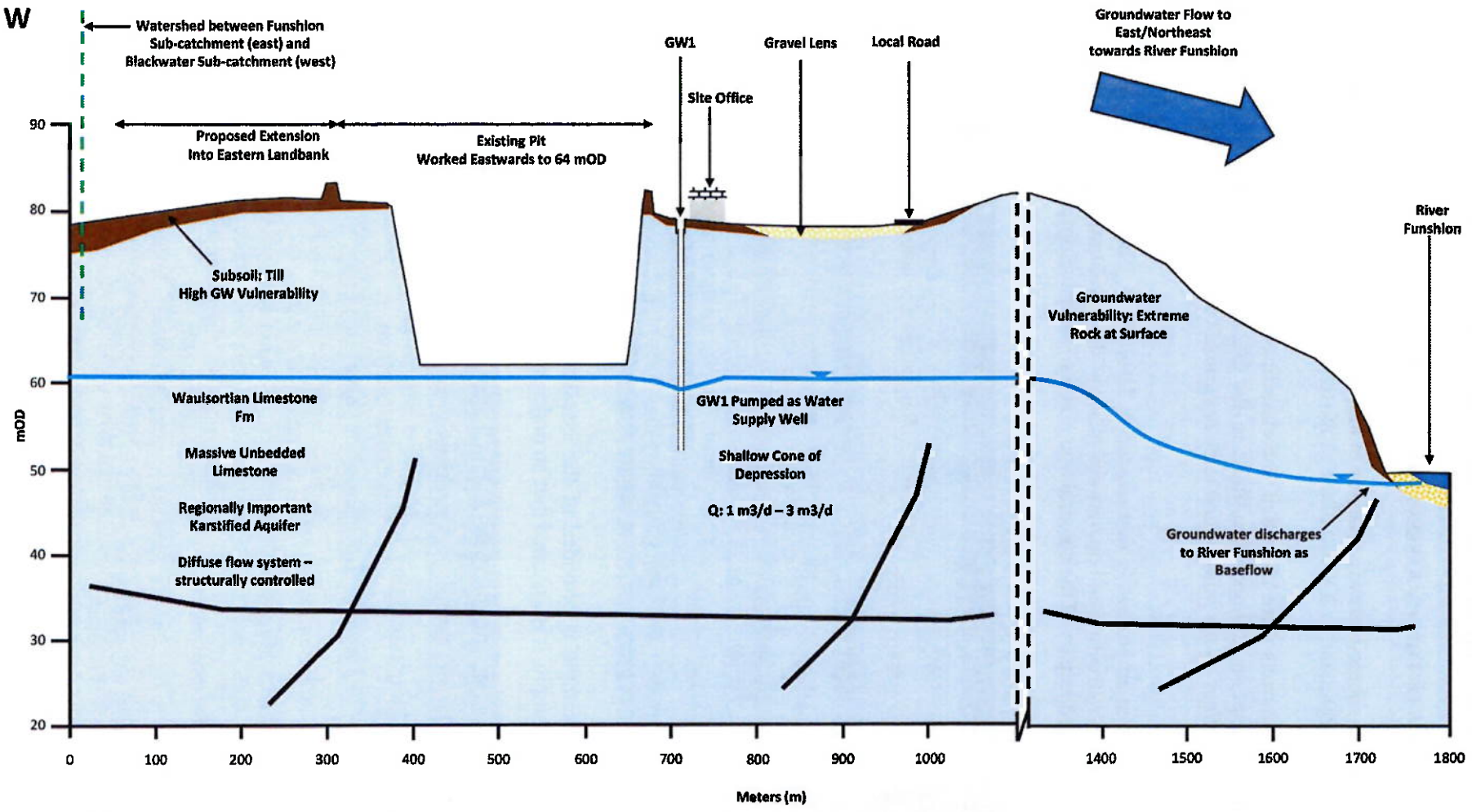

Figure 9.16: Conceptual Site Model

9.8 POTENTIAL IMPACTS & MITIGATION MEASURES

9.8.1 OVERVIEW OF IMPACT ASSESSMENT PROCESS

The conventional source-pathway-receptor model was applied to assess the potential impacts on the water environment, as a result of the proposed development.

Where potential impacts were identified, the classification of the impacts in the assessments follows the description of impacts outlined in the 2022 Environmental Protection Agency document: *Guidelines on the Information to be contained in Environmental Impact Assessment Reports.*

The impact assessment process is summarised in **Table 9.15**. The impact assessment process is applied to the construction and operational phase of the development. The decommissioning phase is considered as part of the construction phase of the development.

Table 9.15: Summary of Assessment Process

Step	Task	Explanation
Step 1	Identify Source	The activity which delivers the potential source of pollution
Step 2	Pathway/Mechanism	The route along which the potential source can travel to the receptor
Step 3	Receptor	The feature which is linked to the source via the pathway
Step 4	Pre-mitigation Impact	Determine the impact on the receptor without intervention/no mitigation measures
Step 5	Identify Mitigation Measures	Identify mitigation measures to prevent or reduce significant impacts on the receptor
Step 6	Residual Impact	The impact on the receptor is reassessed following the recommendation/installation of mitigation measures
Step 7	Determine Significant of Effects	Describes the effects on the environment once the mitigation measures are installed and operational

A hypothetical example is provided of the assessment process in following table. For the purpose of the example, it is assumed that an underground fuel storage tank is at a fuel station.

Step	Task – Example	Explanation – Example
Step 1	Identify Source	Leaking subsurface fuel storage tank
Step 2	Pathway/Mechanism	Migration through the subsoil and with groundwater to a downgradient stream
Step 3	Receptor	Stream downgradient of site
Step 4	Pre-mitigation Impact	Indirect, negative, significant, temporary, low probability on the downgradient stream
Step 5	Identify Mitigation Measures	Install leak detection system in tank, integrity test tank and monitoring of upstream/downstream water quality on stream
Step 6	Residual Impact	Indirect, negative, slight, temporary, low probability on the downgradient stream
Step 7	Determine Significance of Effects	No significant impact on groundwater quality/stream/subsoil are expected due to the installation of an underground fuel storage tank on the hypothetical site, as the mitigation measures in place will detect any potential leaks and enable repairs to be completed

9.8.2 CONSTRUCTION PHASE IMPACT ASSESSMENT

The following impacts were identified for the construction phase of the quarry. Mitigation measures are proposed to reduce or eliminate such risks to the land, soil and water environment:

a) Land Take

The progressive expansion of the quarry into the west/south west land bank is an unavoidable risk. However, the economic benefits of the extraction of high quality limestone for road improvement works; production of aggregates and lime as a soil improver in a rural setting outweigh the potential negative impacts of the land take.

The overall loss of 3.84 ha of highly productive, deep, well drained good quality agricultural land is a direct, negative, not significant, permanent impact. However, the productivity of the soil will be utilised elsewhere on the site, through the formation of a bund around the quarry.

b) Stripping Back Operations

The subsoil overlying the bedrock will be stripped back, and used to form a bund around the perimeter of the quarry.

Source: runoff from stripping operations/erosion of bund during heavy rainfall

Pathway: overland flow across fields

Receptor: Unlikely to reach the River Funshion due to the distance, however small scale localised impacts may occur on adjoining fields.

Pre-mitigation impact: Indirect, negative, imperceptible, temporary, likely impact on surface water receptors.

Mitigation measures:

- Stripping back operations will be completed on a phased basis. Excavation and moving of subsoil during stripping back will be planned outside periods of heavy rainfall, to limit/prevent the risk of suspended solids becoming entrained in surface water runoff.
- The bund will be seeded with grass to prevent erosion during periods of heavy rainfall. Trees will also be planted on the bund to prevent erosion.
- Appropriate fencing and signage will be installed to warn trespassers of the risk of climbing the bund and the steep quarry edge.
- Silt fences will be installed downgradient of the stripping back operations.

Residual impact: Indirect, negative, imperceptible, brief, low probability of an impact on surface water receptors.

Significance of effects: No significant impacts on surface water quality are anticipated due to the distance from receptors/surface water features and the installation of silt fences.

c) Excavation of Bedrock

The excavation of Waulsortian Limestone bedrock will increase the groundwater vulnerability and recharge potential of the quarry footprint. These are permanent and unavoidable risks associated with quarrying. The impact of quarrying limestone will be limited to the footprint

of the quarry, and will be largely localised. As the excavation of the limestone will take place above the water table, there will be no impact on groundwater flow paths.

The excavation of bedrock will have a negative, direct, slight and permanent impact on the geological/hydrogeological setting of the Carrigdownhane Upper area.

9.8.3 OPERATIONAL PHASE IMPACT ASSESSMENT

The following impacts were identified for the operational phase of the quarry. Mitigation measures are proposed to reduce or eliminate such risks to the land, soil and water environment:

a) Water Supply Well

GW1 is used as the main water supply well for the quarrying operations with GW2 as the backup supply. Both wells are located in a secure area and are not at risk of being damaged by passing plant/HGVs. The well head protection is good, with a cap and secure pipework at GW1. However, both wells would benefit from the installation of a concrete plinth around the steel casing, to prevent surface water seeping down the annulus between the casing and subsoil. This is recommended as a mitigation measure and will protect groundwater quality.

b) Activation of Kast

Karst features such as enclosed depressions, caves, springs and swallow holes are widespread throughout the wider Rockmills region. While no karst features were identified during the quarrying operations to date or during the site walk over by a hydrogeologist, it is possible that subsurface karst features may be present in the quarry extension area. If a karst feature is encountered, all quarrying activities should immediately cease, and the advice of a competent hydrogeologist should be sought.

The exact approach of how to deal with karst features depends on the type, nature and scale of the feature uncovered. In this instance, until the feature is examined by a hydrogeologist, no drainage should be directed to the feature and all plant/machinery should remain clear of the feature.

c) Groundwater Quality

Removal of overburden and extraction of rock will increase the groundwater vulnerability and the potential for direct migration of contaminants to the aquifer. The site operations contain a number of processes that could pose a risk to groundwater quality:

Source: Diesel fuel, lubricating oil, ad-blue (mixture of urea and deionized water) and occasionally explosives when blasting takes place.

- Drips, spills or leaks from refuelling operations, unloading tankers delivering fuel to the site or barrels storing oil.
- Leaking plant and equipment
- Poor house keeping
- Blasting of rock using explosives

Pathway: Vertical migration through the quarry floor/unsaturated bedrock down into the water table. The contaminants will then migrate with groundwater flow in the saturated zone to the north east, towards the River Funshion where they will discharge as baseflow.

Receptor: Regionally important aquifer and River Funshion.

Pre-mitigation impact: Indirect, negative, slight, short term, likely impact on groundwater

Indirect, negative, temporary, not significant, unlikely impact on surface water

Mitigation measures:

- The fuel tanks which store diesel should be protected by a concrete plinth and bund capable of containing 110% of the volume of fuel stored onsite. The bund should be integrity tested every 3 years.
- All refuelling takes place in a designated area. The refuelling area is paved with solid concrete with all drainage directed to an oil-water interceptor before being discharged to a soak away area. The oil-water interceptor should be cleaned regularly.
- Lubricating oil and ad-blue should be stored in a secure, sealed, locked container which is protected by a bund.
- Daily inspections of plant and equipment are completed by all operators. Any plant which breaks down or is found to be leaking is parked in the paved concrete area which drains to the oil-water inceptor. All plant is moved offsite for service, repair and routine maintenance as there are no workshops onsite.
- All staff are trained in good-housekeeping procedures.
- The quarry operations use a licenced and competent contractor to undertake blasting on 3 occasions throughout each year. Kemex is used in blasting to fracture and blow out bedrock for processing. Kemex is composed of a gassed emulsion and an ammonium nitrate/fuel oil mixture. The blasting contractor should ensure that the blasting procedure is designed to prevent/reduce the occurrence of ammonia/nitrate residues and that any excess explosives are appropriately disposed of to prevent deterioration in groundwater quality.

Residual impact: Indirect, negative, imperceptible, temporary, unlikely impact on groundwater and surface water

Significance of effects: No significant impacts on groundwater are anticipated provided mitigation measures are adhered to. No significant impact on surface water due to convoluted pathways and the distance to receptors.

d) Sediment Runoff

There is no runoff from the existing quarry pit, as all water infiltrates into the aquifer. The volume of water used in sprinkling for producing 806 fill is minimal, and this is absorbed by the fill material. In addition, stockpiles are constantly monitored to ensure the fill material is not ''over saturated'' and as a result there is no runoff from the 806 stockpiles. Sprinkling takes place in the quarry pit. The 806 material is moved offsite immediately after sprinkling, as it must be laid on roads when damp.

The access road is paved in concrete and falls to a nearby field, where surface water will infiltrate to groundwater. The site has a wheel wash facility installed, and is operational. In addition, the site operatives constantly sweep the access road to ensure it is clean, and free from any debris. Therefore, mitigation measures are in place and are operational. It is essential that these mitigation measures remain in place, are maintained and improved as required.

9.8.4 'DO NOTHING' SCENARIO

The existing land bank would continue normal operations under a ''do nothing'' scenario, whereby the land would be used for beef farming and producing silage for housing cattle during the winter months.

9.8.5 'WORST CASE' SCENARIO

The worst case scenario envisaged is the large scale spillage of hydrocarbons (lubricating oil or diesel fuel) from a fuel tank onsite or a truck delivering fuel to the site. This would have a negative impact on the groundwater quality and the regionally important aquifer in the wider area. However, mitigation measures will be put in place to reduce the risk of such incidents happening.

9.8.6 CUMULATIVE IMPACTS

There are no proposed or existing quarrying operations in the wider area of Rockmills. Therefore, there are no significant cumulative impacts on the land, soil or water environment from the proposed quarry extension, provided the proposed mitigation measures put in place and adhered to.

9.9 MONITORING

The following monitoring programme should be implemented at the quarry:

1. Groundwater Level Monitoring

Monthly water level monitoring should take place at GW1 and GW2. However, it should be noted that GW1 is a water supply well and the water levels measured in GW1 are dynamic water levels as they are under the influence of pumping. The groundwater level should be measured from the top of the steel casing, and stored in a database.

2. Groundwater Quality Monitoring

Groundwater sampling should take place on both GW1 and GW2 on a bi-annual (March/September) frequency for the following list of parameters:

a) Chloride
b) Sodium
c) Potassium
d) Nitrate
e) Nitrite
f) Ammonia
g) Orthophosphate
h) Total Petroleum Hydrocarbons (with banding)
i) Mineral Oil
j) Total Coliforms
k) Faecal Coliforms

SECTION C - ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

This section of the Environmental Impact Assessment Report examines impacts of the proposed development on archaeology, architecture and cultural heritage.

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Cork. As part of the scope and examination of alternatives phases of this development, every effort has been made to avoid known Archaeological, Architectural and Cultural Heritage sites.

This section of the EIAR examines the impacts of the proposed development on known sites (which could not be avoided) or areas of potential archaeological significance which have come to light during the field survey of the proposed development.

10.0 ARCHAEOLOGY, ARCHITECTURAL & CULTURAL HERITAGE

10.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the archaeological, architectural and cultural heritage effects of the proposal for the continuation and extension of an existing quarry, together with all ancillary site works and services at the Rockmills Limestone Quarry, in the townland of Carrigdownane Upper, Co. Cork (**Figure 10.1**).

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely and significant effects on the receiving environment and to propose ameliorative measures to mitigate these effects.

The assessment has been carried out by Fiona Reilly MA, MIAI, and Robert Hanbidge of Shanarc Archaeology Ltd., on behalf of Rockmills Quarry Ltd. and Panther Solutions Ltd., in support of a planning application to Cork County Council.

10.1.1 DEFINITION OF ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE

The term 'cultural heritage' is broadly used to describe any combination of archaeological, architectural and cultural heritage features.

- Archaeological heritage comprises objects, monuments, buildings, landscapes, underwater archaeology and areas of archaeological potential (including unknown archaeology).

- Architectural heritage, also referred to as built heritage, comprises of various structures, buildings, their settings and contents and generally post-date AD1700.

- Cultural heritage also includes tangible heritage (movable, immobile and underwater), intangible cultural heritage (oral traditions, folklore etc) embedded into cultural and natural heritage artefacts, sites or monuments. It additionally covers industrial heritage.

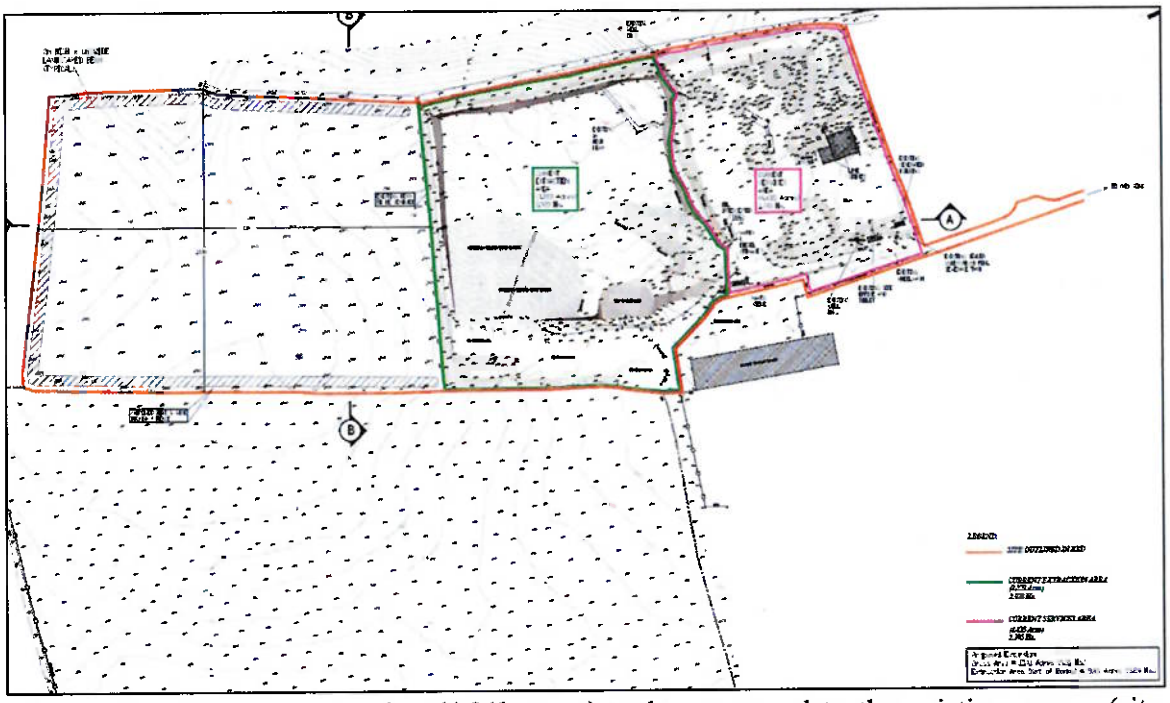

Figure 10.1: Proposed extension (4.21hectare) and access road to the existing quarry (site boundary in red) (Source: Murphy McCarthy Consulting Engineers Ltd.)

10.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY

10.2.1 LEGISLATIVE CONTEXT

Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments ad Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- EIA Directive.

National legislation protecting cultural heritage comprises:

- National Monuments Act 1930 (as amended);
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Act 2000 (as amended).

In addition to standards and guidelines relating to the preparation of EIAR's, the following cultural heritage guidelines were consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers, The Heritage Council;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority; and
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority;
- Architectural Heritage Protection Guidelines for Planning Authorities (2011), Department of Arts, Heritage, Gaeltacht & the Islands.

10.2.2 PLANNING POLICIES

The Cork County Development Plan 2022-2028 came into effect on the 6th June 2022. It contains policies of relevance to archaeology, architecture and cultural heritage.

Objective HE 16-2: Protection of Archaeological Sites and Monuments states:

'Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments and their setting included in the Sites and Monuments Record (SMR) (see www.archaeology.ie) and the Record of Monuments and Places (RMP) and of sites, features and objects of archaeological and historical interest generally. In securing such preservation, the planning authority will have regard to the advice and recommendations of the Development Applications Unit of the Department of Housing, Local Government and Heritage as outlined in the Frameworks and Principles for the Protection of the Archaeological Heritage policy document or any changes to the policy within the lifetime of the Plan.'

Objective HE 16-5: Zones of Archaeological Potential states:

Protect the Zones of Archaeological Potential (ZAPs) located within historic towns, urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the upstanding and potential for subsurface archaeology, through appropriate archaeological assessment.'

Objective HE 16-9: Archaeology and Infrastructure Schemes states:

'All large scale planning applications (i.e. development of lands on 0.5 ha or more in area or 1km or more in length) and Infrastructure schemes and proposed roadworks are subjected to an archaeological assessment as part of the planning application process which should comply with the Department of Arts, Heritage and the Gaeltacht's codes of practice. It is recommended that the assessment is carried out following pre planning consultation with the County Archaeologist, by an appropriately experienced archaeologist to guide the design and layout of

the proposed scheme/development, safeguarding the archaeological heritage in line with Development Management Guidelines.'

Objective HE 16-11: Archaeological Landscapes states:

'To protect archaeological landscapes and their setting where the number and extent of archaeological monuments are significant and as a collective are considered an important archaeological landscape of heritage value.'

Objective HE 16-13: Undiscovered Archaeological Sites states:

'To protect and preserve previously unrecorded archaeological sites within County Cork as part of any development proposals. The Council will require preservation in situ to protect archaeological monuments discovered. Preservation by record will only be considered in exceptional circumstances.'

Objective HE 16-14: Record of Protected Structures states:

'a) The identification of structures for inclusion in the Record will be based on criteria set out in the Architectural Heritage Protection Guidelines for Planning Authorities (2011).

b) Extend the Record of Protected Structures in order to provide a comprehensive schedule for the protection of structures of special importance in the County during the lifetime of the Plan as resources allow.

c) Seek the protection of all structures within the County, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In accordance with this objective, a Record of Protected Structures has been established and is set out in Volume Two Heritage and Amenity, Chapter 1 Record of Protected Structures.

d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.

e) Protect the curtilage and attendant grounds of all structures included in the Record of Protected Structures.

f) Ensure that development proposals are appropriate in terms of architectural treatment, character, scale and form to the existing protected structure and not detrimental to the special character and integrity of the protected structure and its setting.

g) Ensure high quality architectural design of all new developments relating to or which may impact on structures (and their settings) included in the Record of Protected Structures.

h) Promote and ensure best conservation practice through the use of specialist conservation professionals and craft persons.

i) In the event of a planning application being granted for development within the curtilage of a protected structure, that the repair of a protected structure is prioritised in the first instance i.e. the proposed works to the protected structure should occur, where appropriate, in the first phase of the development to prevent endangerment, abandonment and dereliction of the structure.'

10.3 METHODOLOGY

The assessment of archaeological, architectural, and cultural heritage effects is based on a desk-top study of relevant archaeological, architectural and cultural heritage sources, supported by an on-site inspection. The following were the principal desk-based sources consulted:

National Monuments
Under the National Monuments Act 1930 (as amended), archaeological sites in the ownership or guardianship of the State or a local Authority and sites under Preservation Orders are designated as National Monuments. Such sites are offered the highest level of protection under Irish legislation.

Record of Monuments & Places and Sites & Monuments Record
The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and records known upstanding monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on aerial photographs. The RMP is based on the Sites and Monuments Record (SMR) files housed at the National Monuments Service, with new sites identified being added to the SMR and then scheduled for inclusion in the statutory RMP.

Topographical Files
The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The find-spots of artefacts can be an important indication of the archaeological potential of an area.

Any archaeological object found without a known owner at the time it was found is protected under National Monument's legislation and is deemed to be in the ownership of the State.

Excavations Bulletin and Excavations Database
The Excavations Bulletin is a published annual directory and an on-line database (www.excavations.ie) that provides summary accounts of all the excavations carried out in Ireland – north and south – from 1969. The on-line database has been compiled from the published Excavations Bulletins from the years 1970-2010, with additional online-only material from 2011 onwards, and is updated on a constant basis.

Archaeological Inventory of County Cork
The Archaeological Survey of Ireland was established under the National Monuments Act 1930 (as amended) to compile an inventory of the known archaeological monuments in the State, and remains ongoing. Amongst the publications on national monuments arising from the work of the Archaeological Survey of Ireland is the Archaeological Inventory Series. The inventory of Co. Cork, Vol. 4, Parts 1 & 2 was published by the Dublin Stationery Office in 2000.

Cork County Development Plan 2022-2028
Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains lists of national monuments, recorded monuments, a Record of Protected Structures (a list of buildings which cannot be materially altered or demolished without grant of permission under the Act) and

Conservation Areas and Architectural Conservation Areas (to protect and enhance the special character of an area). The Cork County Development Plan 2022-2028 sets out the policies and objectives of the Council in respect of archaeology, architecture and cultural heritage in Chapter 16 of the Plan. County Cork Heritage Plan 2005-2010 was also consulted.

National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Housing, Local Government and Heritage. The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from AD1700 to the present day and includes country houses, churches, mills, bridges and other structures of note. As well as a survey of buildings and structures, the NIAH has also carried out a survey of historic gardens and designed landscapes. The objective of the latter is to better understand the extent of the countries historic gardens and designed landscapes. The Garden Survey does not as yet outline the heritage importance of the recorded gardens or designed landscapes. The NIAH building survey of east County Cork was carried out in the summer of 2007, and is a representative sample of the post-1700 architectural heritage of the eastern part of the county.

Cartographic Sources

Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites, including cultural landscapes e.g. demesne landscapes, which, based on the level of landscape change, are now often identified from cartographic records alone. The earliest Ordnance Survey maps date to the late 1830s and early 1840s, but much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century, making these a valuable resource in tracing the development of a study area.

Aerial Photographs

Aerial photographs are a useful aid in identifying archaeological monuments that are not visible at ground level. Variations in the way plants grow can indicate subsurface remains and can indicate the location of subsurface monuments such ranging from enclosures to deserted villages. ***LiDAR imagery*** LiDAR is a scanning system that uses laser light emitted from equipment on low flying aircraft. The reflected light allows measurements to be taken of the earth's surface from which topographical maps are created. This data is available through Open Topographic Data Viewer hosted by the Geological Survey of Ireland (dcenr.maps.arcgis.com).

Toponomy Sources

A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey, which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (wwww.logainm.ie) hosts online bi-lingual placename research and archival records for townlands. P. W. Joyce's (1910) *The Origin and History of Irish Names of Places*, is also an invaluable source for townland name meanings.

Documentary Sources

Documentary sources are a valuable means of completing the written archaeological, architectural and cultural heritage record of an area, and of gaining insight into the history of the receiving environment. A list of all consulted documentary sources is provided in bibliographic form.

On-site Inspection
On-site inspection offers the opportunity to examine a study area in light of desk-based research and evidence. Inspection is essential in determining the nature and extent of any surviving above-ground evidence, and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection of the proposed quarry extension was conducted by Fiona Reilly, Shanarc Archaeology Ltd., on 9th June 2022, in the company of Jim Lynch, manager at Rockmills Limestone Quarry.

10.3.1 IMPACT ASSESSMENT CRITERIA

The impact assessment undertaken in this chapter is based on the methodologies presented in the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*, published May 2022.

A potentially significant effect in terms of archaeology, architecture and cultural heritage is described as an effect to a potential feature/area of archaeological, architectural or cultural heritage that could be significant without mitigation measures being implemented e.g. potential subsurface archaeological remains.

10.4 DESCRIPTION OF THE EXISTING ENVIRONMENT

10.4.1 SITE DESCRIPTION

Rockmills Limestone Quarry is located in an undulating, rural landscape predominantly under pasture. *Turloughs*[1] can be found in the broader landscape, including in the adjacent field to the north of the quarry. Sub-circular or sub-oval shaped features appearing as cropmarks on aerial photography may relate to these geological features. The field boundaries at the site are mostly ditches of thick mature hedgerow. The quarry is sited to the north and north-west boundary of a large tyre recycling compound that shares the same entrance and access track from the public road. The existing quarry and proposed extension is located in the townland of Carrigdownane Upper, in the Civil Parish of Carrigdownane and the Barony of Fermoy, Co. Cork. The quarry is accessed from a local road off the R512 from Glanworth to Kildorrery, approximately 4km north-west of Glanworth in Co. Cork (**Figure 10.2**).

Carrigdownane Upper townland is situated on an east to west running plain between the Galtee Mountain range to the North and the Nagle's to the south; both ranges are visible from the quarry. The townland also lies between the River Funshion to the east and the Awbeg River to the west; both rivers flow southwards to the River Blackwater. The village of Kildorrery is visible from the Quarry to the north-north-west. The plain is crisscrossed with minor roads, and owing to its location between mountain ranges has several main roads running through it such as the M8, N73 and N72.

A previous extension to the quarry was subject to a grant of planning in 2015, under planning reference 15/5484. An Archaeological Impact Assessment (AIA), which included archaeological testing, was carried out as part of the planning process at that time, under

[1] A *turlough* is a low-lying area on limestone that becomes flooded in wet weather as a result of the welling up of groundwater from the rock.

excavation licence no. 15E0457. Nothing of archaeological significance was discovered during archaeological testing (Hourihan 2015).

The proposed quarry extension lies to the west of the existing quarry, encompassing a single agricultural field. The field is relatively flat in its eastern part, but the surface slopes considerably downwards in the north-western corner. It was in meadow with very long grass and wild flowers at the time of the site inspection. The southern boundary comprises a substantial bank topped with mature trees, which represents the townland boundary between Carrigdownane Upper and Lisnagoorneen. The species growing in the hedgerow included blackthorn, hawthorn, sycamore, ash, elder, dog rose, cow parsley and hogweed.

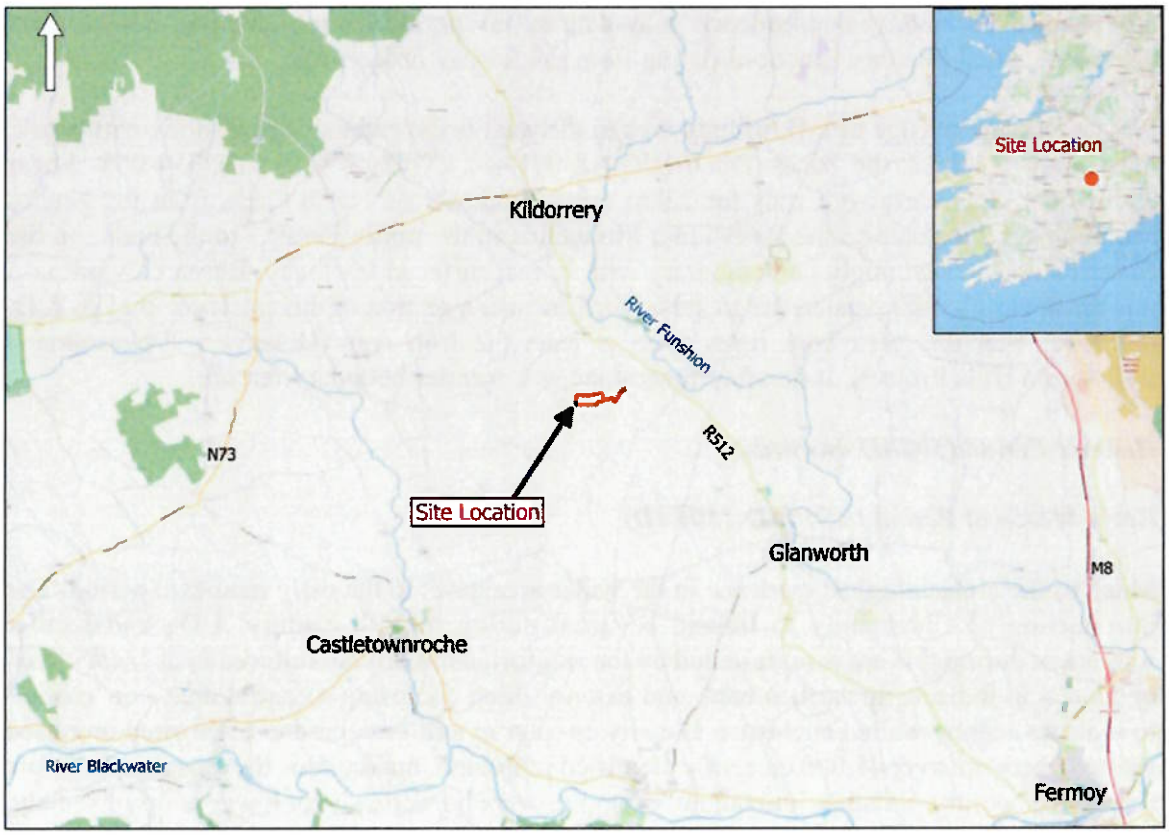

Figure 10.2: Site Location

10.4.2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Prehistoric Period (7000BC-500AD)

There are no previously identified prehistoric monuments within the immediate surrounds of the existing quarry and proposed extension area. Three enclosures are located within 1km (CO026-026----, CO026-210----, CO026-243----). These could potentially date to the prehistoric period but could also be early-medieval in date. A ring-ditch (CO027-180) located at Ballykeating, *c.* 1.8km to the east, is also potentially prehistoric in date. The monument was identified through aerial photographs as a crop mark, and measures approximately 10m in diameter. Ring-ditches may be the remains of ploughed out barrows, round houses or other modern features and, in consequence, may date to any period from prehistory onwards, but often have ritual funerary functions dating from the Bronze or Iron Age.

Situated along the edge of a 1km study area to the west is the extensive prehistoric earthwork, the Claidh Dubh or the Black Ditch (CO018-001----; CO026-099----; CO034-055- linear earthwork). This earthwork runs for 22km north-south across North Cork, from the Nagles Mountains in the south to the Ballyhoura Mountains in the north. Parallel to the bank, on the eastern side and seemingly contemporary with it, is a surfaced trackway. Research work into this linear earthwork revealed that peat had formed over a section of this trackway by 100 A.D. indicating that this earthwork dates from at least the Iron Age (Discovery Programme – Ballyhoura Hills Project). It possibly functioned as a frontier boundary feature.

Historic Period (500AD onwards)

Early Medieval Period (c.500AD-1100AD)

Much of the archaeological evidence in the wider area dates to the early medieval period. The introduction of Christianity to Ireland occurred during the 5th century A.D., and secular settlement during this era is represented by the ringfort, alternatively referred to as '*rath*' '*lios*' or '*dún*' - to indicate an earthen bank and exterior ditch enclosing a central area - or '*cashel*' to indicate a stone-walled enclosure. Usually circular or sub-circular and often sited on raised ground, there are over 45,000 currently identified in Ireland, making this the most common site type in the country. Smaller, 'univallate' examples were homesteads for lower ranks of society, while larger bi- or tri-vallate examples were used by lords or wealthy landowners.

A number of ringforts are located in the wider landscape and indicate a high rural population during the period supported by the fertile nature of the area. Five ringforts are within 1km of the proposed quarry extension, including a destroyed site (CO026-024----) within the existing tyre recycling compound to the south-east of the existing quarry. There are two enclosures (CO026-210----, CO026-243----) and a ringfort (CO026-023----) listed in the townland of Lisnagoorneen. Its name contains the Irish root word *lios*, which is indicative of a fort or enclosure. The parish church of Carrigdownane survives as the ruin of a late medieval church surrounded by a graveyard (CO018-092001-, CO018-092002-), sited 1.4km to the north-east.

Late Medieval (c.1100AD-1650AD)

The late medieval period dates from the mid-12th century to the mid-16th century. This is a time of much change in Ireland, with the invasion of Anglo-Normans at Wexford in 1169, the introduction of the first parliament and coinage and the 12th century reform of the church. It is

also the period of castle building, from early motte-and-bailey castles of timber construction, to great Anglo-Norman stone castles and later tower houses. The only site dated to this period within 1km of the proposed quarry extension is a moated site 0.9km to the south-west (CO026-022001-). A moated site is generally a square, rectangular or occasionally circular area, sometimes raised above the ground, enclosed by a wide, often water-filled, fosse, with or without an outer bank and with a wide causewayed entrance. They date to the late 13th /early 14th centuries and were primarily fortified residences/farmsteads of Anglo-Norman settlers, though they were also built by Gaelic lords. The Anglo-Norman castle (CO019-078----) at Carrigdownane Lower, 1.7km to the north-east, is indicated on the mid-17th century Down Survey maps **Figures 10.3 and 10.4**. Milo fitzPhilip de la Roche was pardoned in 1317 for 'the burning of the Condon manor of Carrickdownane' (MacCotter and Nicholls 1996, 238). The castle was subsequently acquired by Roches during 14th century (Nicholls 1993, 186).

Early Modern Period (c.1650AD-c.1850AD)

Country houses were to become dominate features of the cultural settled landscape in the early modern period, and several country houses, with ancillary outbuildings and gate lodges, set in demesne landscapes, were established in this part of Co. Cork. Several manor houses dot the countryside, especially along the picturesque River Funshion. Stannard's Grove lies 1.6km to the north-east of the proposed quarry extension. Within its grounds lies a designed landscape feature, a belvedere (CO018-098----), which is a small tower on a knoll from which the view can be admired. Rockmills Lodge (NIAH Reg. No. 20901821) lies further upstream and is a five-bay two-storey country house with a courtyard and outbuildings built in 1776. The corn mill of the same name lies downstream from the house. It was originally built by Richard Aldworth and Rev. Delaney in 1776. According to Lewis (1837, Vol. 2, 420) the mill was capable of producing nearly 12,000 sacks of flour annually. The village of Rockmills to the west of Rockmills Lodge gets its name, according to Lewis, from the mill.

The quarrying and burning of lime for use as a fertiliser was widely practiced in Ireland, even in living memory. This part of Co. Cork was no exception, with many lime kilns marked on the 1st edition 6-inch maps, including several within 1km of the proposed quarry extension, including one that was formerly situated within the footprint of the existing quarry. In 1837, Lewis recorded that limestone was plentiful in Carrigdownane parish and was quarried for burning into lime and used as 'the principal manure' (Lewis 1837).

10.4.3 CARTOGRAPHIC ANALYSIS

Analysis of historic mapping shows how landscapes evolve. Comparing successive historic maps can show how archaeological and architectural sites have been created, altered or removed over a period of time. The following historic maps were consulted, of which relevant extracts are presented below.

- Down Survey map of Co. Cork, 1656-58 (**Figure 10.3**);
- Down Survey map of Barony of Fermoy, 1655 (**Figure 10.4**);
- First edition Ordnance Survey 6-inch map, sheet CK026, 1844 (**Figure 10.5**);
- Revised Ordnance Survey 25-inch map, CK026-04, 1905 (**Figure 10.6**), and
- Revised Ordnance Survey 6-inch map, CK026, 1935 (**Figure 10.7**).

Down Survey Maps 1656-58

The Down Survey is a mapped survey carried out from 1656 - 1658 under the direction of Sir William Petty that recorded land confiscated from Irish Catholics to facilitate Cromwellian settlement. The survey recorded townland boundaries, their areas and proprietors with precision throughout Ireland. The resultant maps contain other detail, such as on roads, rivers, towns, churches, castles, houses and fortifications, as well as topographic and landuse detail.

Figure 10.3: Extract from Down Survey map of County Cork, 1656-58 (Source: downsurvey.tcd.ie).

The Down Survey map of Co. Cork (**Figure 10.3**) and the map of the Barony of Fermoy (**Figure 10.4**) both depict Carrigdownane parish as *Carrigdownan*. The River Funshion can be seen winding its way south-east on both maps. The townlands of Carrigdownane Upper, Carrigdownane Lower and Lisnagoorneen were included in Carrigdownane parish. A castle (CO019-078----) is depicted on the county map, close to the river; this castle is also depicted on the barony map with a mill to the south. The exact location of this mill is unknown today. It is interesting to note that the townland across the river to the north-east, Derryvillane (*Deryvillan*), was recorded on the same map as 'unforfeited,' implying that is it was already in Protestant owners' hands. The more detailed Down Survey parish map is not available for the Parish of Carrigdownane.

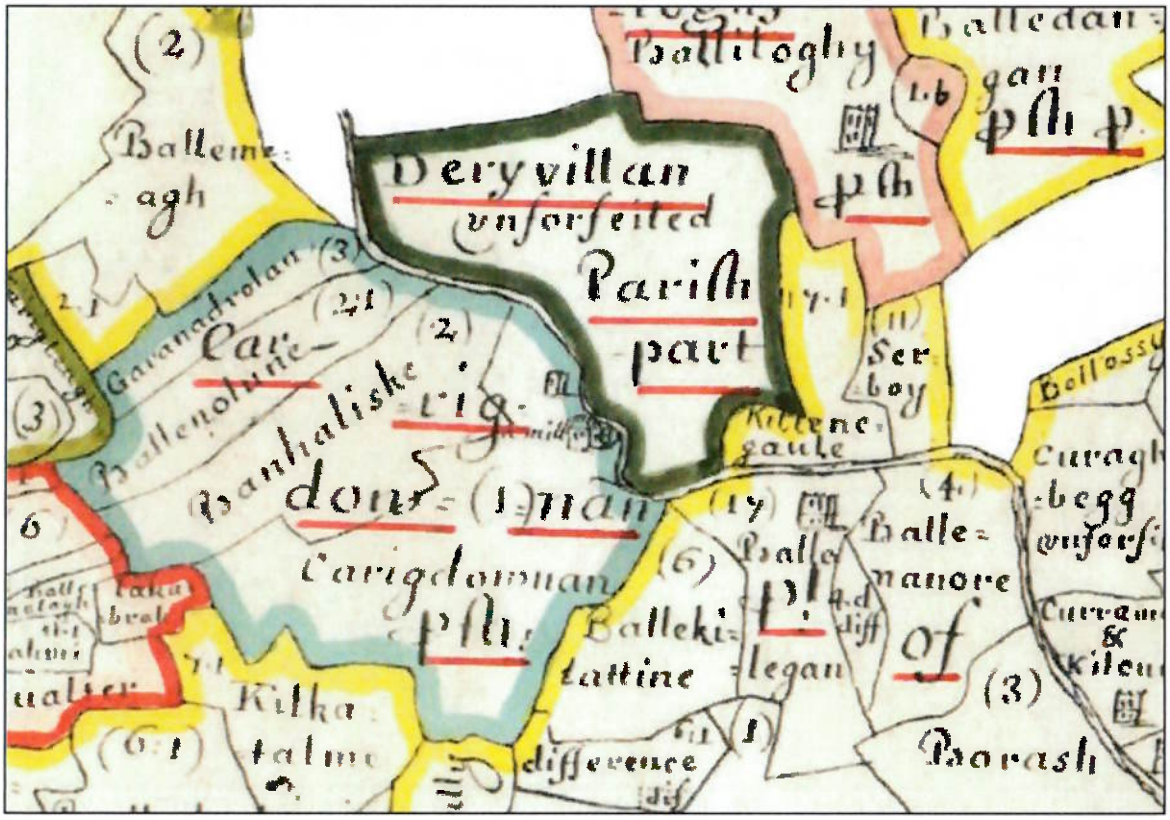

Figure 10.4: Extract from Down Survey map of the Barony of Fermoy, 1656-58 (Source: downsurvey.tcd.ie).

Ordnance Survey Maps

The first ever large-scale survey of Ireland was undertaken by the Ordnance Survey (OS) between 1829 and 1842, producing highly accurate maps at different scales. The 1st edition 6-inch OS map was surveyed in 1840 and published in 1844, and is the first map to the show the Existing Rockmills Limestone Quarry and proposed quarry extension in any detail (**Figure 10.5**).

The quarry site on the 1st edition 6-inch OS map is represented by a farm holding, comprising three buildings around a yard, which was accessed from the east by a lane from the public road. This lane, aligned on field boundaries, ran by way of a lime kiln (represented by a circle and dot), and is still present, running to the south of the current quarry access road.

A well-defined ringfort (CO026-024----) is depicted next to the farmyard, with both the ringfort site and former farm holding being within the grounds of the present tyre recycling compound. A lane continues westwards of the ringfort and farmyard, accessing a second lime kiln, which was formerly situated within the existing quarry footprint.

The proposed quarry extension is shown as comprising of enclosed fields, with the Carrigdownane Upper and Lisnagoorneen townland boundary forming the southern, western and a portion of the northern field boundaries.

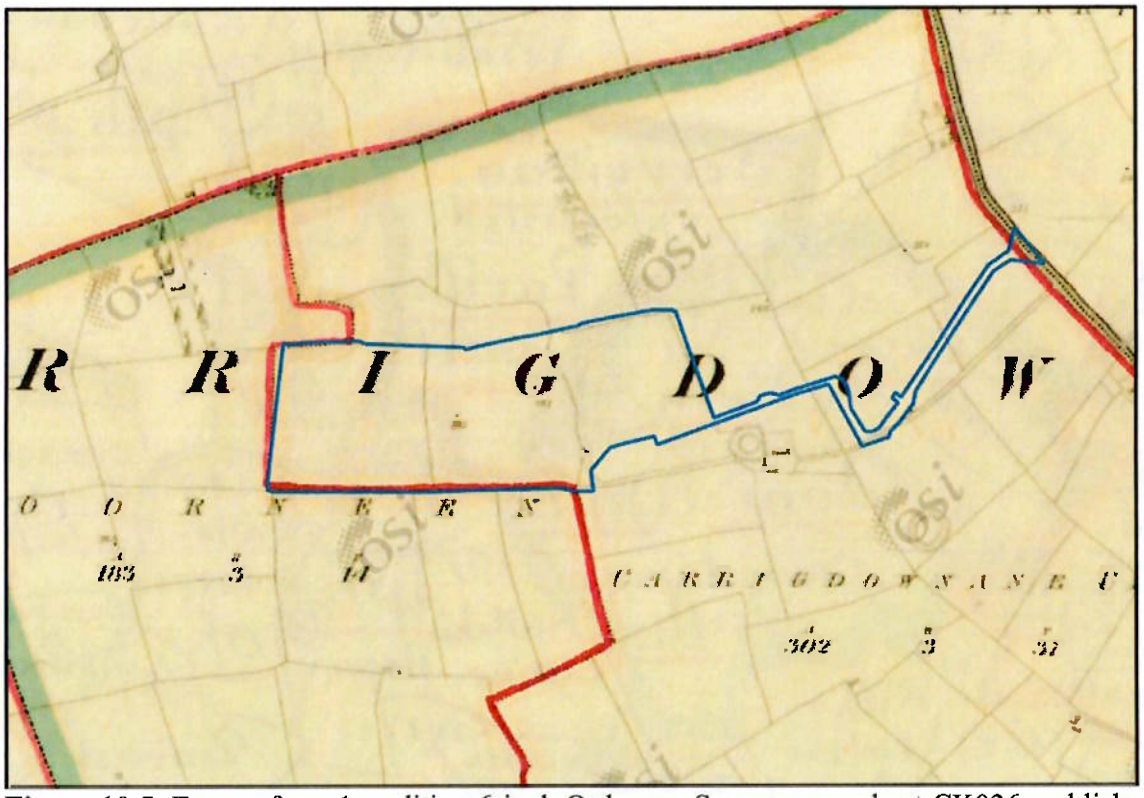

Figure 10.5: Extract from 1st edition 6-inch Ordnance Survey map, sheet CK026, published 1844, showing site location (in blue) (OSi Licence CYAL50313607).

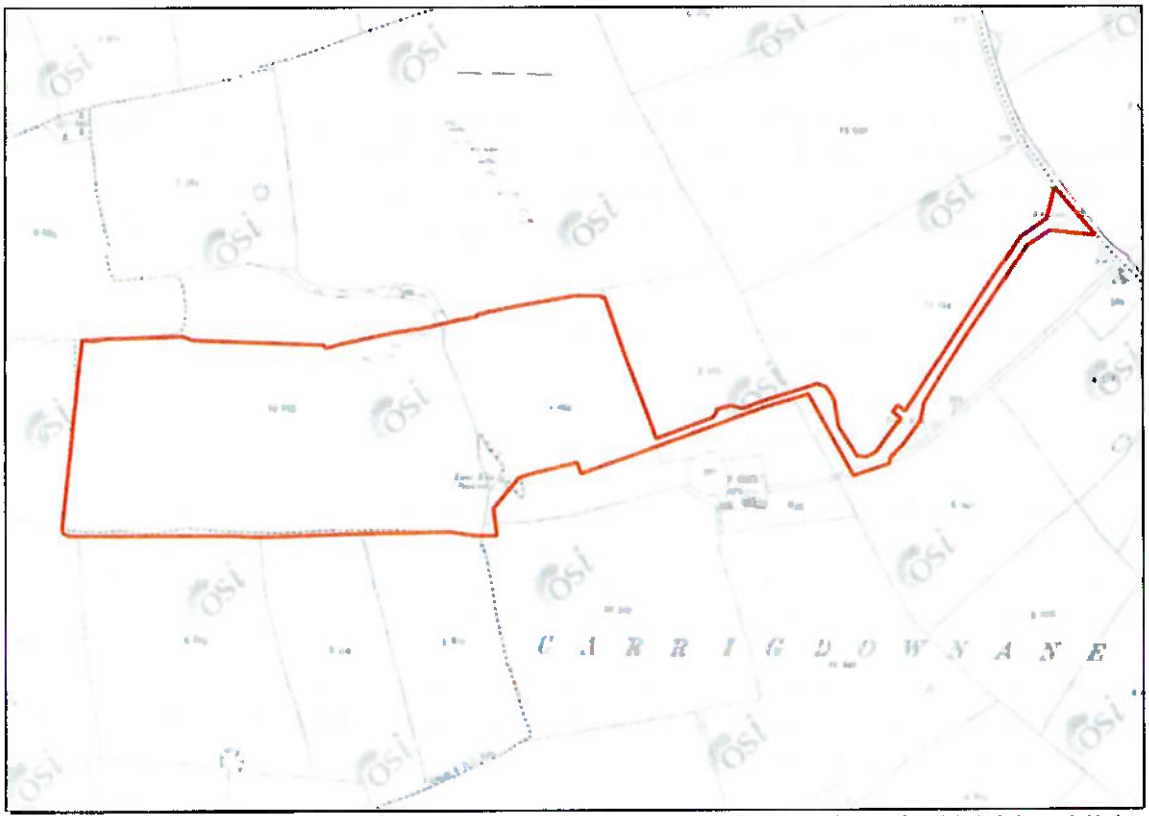

Figure 10.6: Extract from revised 25-inch Ordnance Survey map, sheet CK026-04, published 1905, showing approximate site boundary (in red) (OSi Licence CYAL50313607).

The 25-inch OS map was surveyed in 1903 and published 1905 (**Figure 10.6**). The farmyard depicted on the 1st edition 6-inch OS map has been slightly enlarged to the south-east corner of the yard, a field boundary having been realigned further south of the yard. Ringfort CO026-024---- is also depicted, to the north-west side of the yard. The farm holding is accessed by the same lane, the lime kiln sited to its north side being annotated. The lime kiln westward of the farmyard is annotated as disused, depicted with associated quarry holes or depressions.

The proposed quarry extension is depicted forming part of a single enlarged field. The townland boundary is shown as in the earlier map.

The last historic 6-inch edition OS map was published in 1935 (**Figure 10.7**). It shows a similar situation except that the area of the proposed quarry extension has again been subdivided into two fields by the addition of a new field boundary. Ringfort CO026-024---- is still extant.

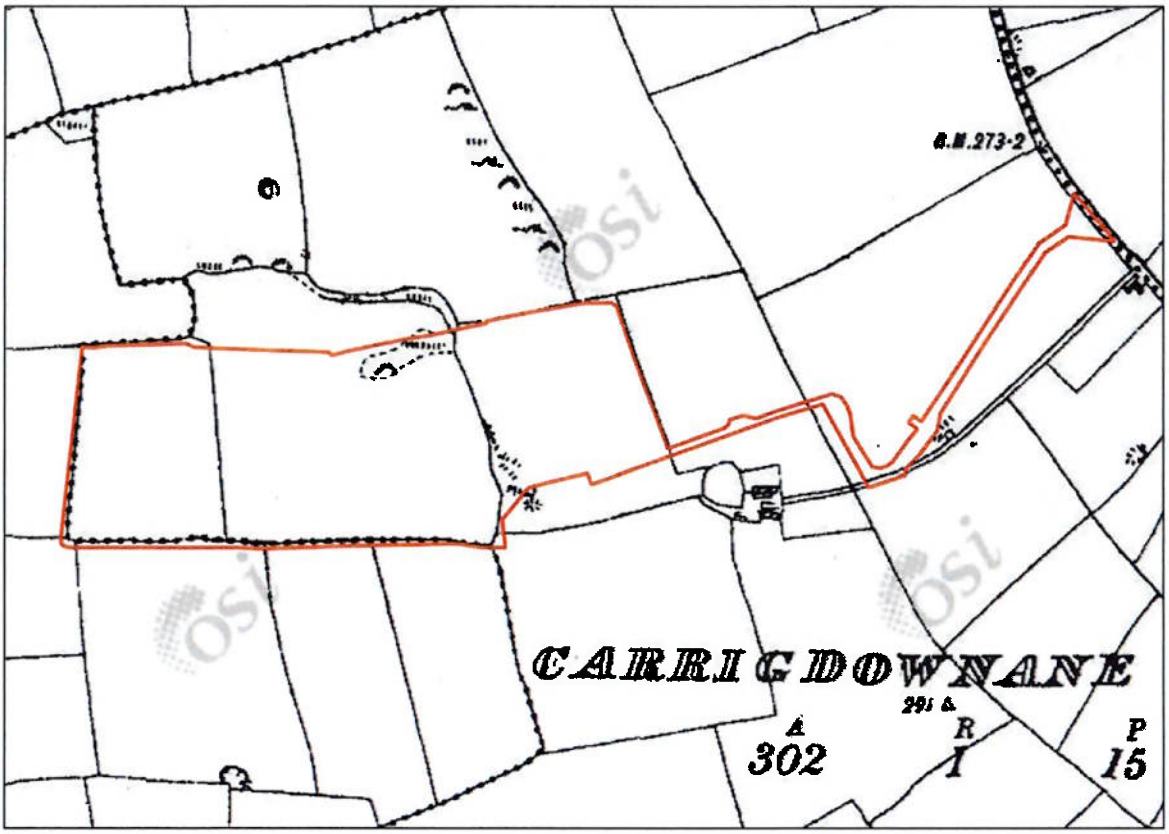

Figure 10.7: Extract from revised 6-inch Ordnance Survey map, sheet CK026, published 1935, showing approximate site boundary (in red) (OSi Licence EN 0077923)

10.4.4 AERIAL PHOTOGRAPHS

The following aerial photographs available on the Ordnance Survey of Ireland (OSi) website, Geohive, were consulted: Aerial 1995, Aerial 2000, Aerial 2005, Aerial 2005-2012, Digital Globe 2011-2013, and Aerial Premium 2013-2018 (accessed 15/06/2022).

The successful detection of archaeological sites through aerial photography varies depending on several factors, including the position of the sun, the type of crop growing and the amount of rainfall in a growing season. In some years, such as during the drought of 2018, sites were clearly visible, while in others the same site would be undetectable from the air.

In the 1995 and 2000 image ringfort CO026-024---- appears to be intact; the monument outline is also visible on the 2005 image. There is a notable development in the modern farmyard footprint over these years. In the later images the site of the ringfort has been subsumed into an enlarged yard compound at the site.

No potential archaeological monuments or features could be detected in all imagery at the proposed quarry extension. The archaeological test trenches excavated in 2015 under licence no. 15E0457 in association with planning reference 15/5484 are visible on the Aerial Premium 2013-2018 image.

10.4.5 LiDAR IMAGERY

LiDAR imagery for this area of Co. Cork is available in the Open Topographic Data Viewer (**Figure 10.8**). The imagery predates the expansion of the existing quarry following the grant of planning under planning reference 15/5484. The undulating nature of the land at, and around the existing Rockmills Limestone Quarry and proposed quarry extension is evident in the imagery, as are depressions resulting from historic limestone quarrying at former lime kiln locations. No potential archaeological monuments or features could be detected in the imagery within the area of the proposed quarry extension.

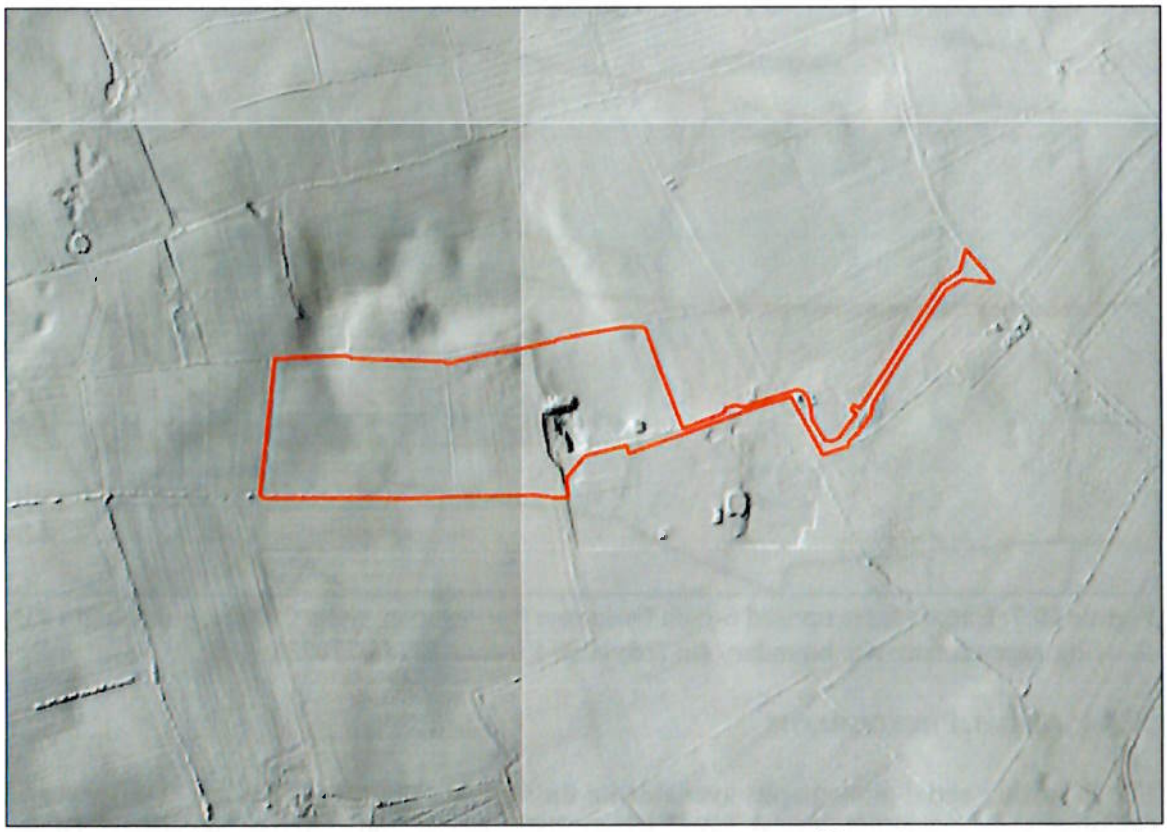

Figure 10.8: LiDAR imagery covering the existing Rockmills Limestone Quarry and the proposed quarry extension (*in red*).

10.4.6 TOPONOMY

The townland name of Carrigdownane derives from the Irish *Carrig Dhúnáin*, rock of the small fort or rock of Dúnán (www.loganim.ie; accessed 14/06/2021). *Carrig,* which signifies a rock, usually refers to a large natural elevated rock (Joyce 1910, 409).

Lisnagoorneen derives its name from the Irish *Lios na Cuirníneach. Lios* means an enclosure. *Cuirníneach* is more difficult to translate; several suggestions have been made including; mass of ringlets, ringlet bearers, curled features, place abounded in little goblets (www.loganim.ie/en/10036; accessed 14/06/2021).

The archives of the Placenames Database of Ireland contain documentation on research results of the Branch. The archive has traced the placename Carrigdownane back to 1300-1, when it is referred to as *Carrykdounan*, and since that time the placename has been recorded under a range of spellings (www.logainm.ie/en/12784; accessed 14/06/2021). Alternate spellings include the reference to *Carriickedownane* (1607) and *Carigdounane* (1739). The townland name of Lisnagoorneen has been traced as far back as 1461 where it was recorded as *Lis na Cuirninech*. Other spelling variations include *Lisnagoorneene* (1666) and *Lisnagoorneen* (1826) (www.loganim.ie/en/10036; accessed 14/06/2021).

10.4.7 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

According to the excavations database (www.excavations.ie; accessed 04/04/2023) there are no records of any previous archaeological investigations within the townland of Carrigdownane Upper. However, an examination of a spreadsheet issued by the National Monuments Service that lists all recorded archaeological investigations and reports, shows two previous archaeological investigations as occurring within the townland of Carrigdownane Upper (or simply Carrigdownane). The first entry relates to a licensed archaeological investigation (licence no. 15E0457) at the existing Rockmills Limestone Quarry. The second entry relates to a non-licensed archaeological investigation (reference 98N0169) at Carrigdownane, Glanworth, County Cork. No further information is provided on either of these previous archaeological investigations.

The excavation licence no. 15E0457 related to the existing Rockmills Limestone Quarry footprint and the grant of planning under planning reference 15/5484. A programme of archaeological testing was carried out under the licence, and followed a cultural heritage impact assessment prepared in relation to the previous extension at the quarry; archaeological testing was carried out to address the archaeological potential of the proposed extension area. No archaeological features, deposits or finds were found during testing (Hourihan 2015). A total of fourteen test trenches measuring a total of 1346 linear metres were excavated under this licence down to the level of natural subsoil or bedrock. It was noted in the testing report that ground conditions varied considerably across the site, with the subsoil varying from orange brown clayey sand to grey silty sand and gravel. The natural limestone bedrock was close to the surface with topsoil measuring from 0.10m to 0.15m deep.

In the neighbouring townland of Lisnagoorneen, the online excavations database records one previous archaeological investigation within this townland. This relates to a programme of licensed archaeological test trenching (22E0670) in advance of a residential extension (Bennett 2022:498). This development site was adjacent to the Claidh Dubh, a prehistoric linear

earthwork running for 22km north-south across North Cork from the Nagles Mountains in the south to the Ballyhoura Mountains in the north. No archaeology was found (*ibid*).

10.4.8 PREVIOUS ARCHAEOLOGICAL OBJECTS RECORDED IN THE NATIONAL MUSEUM OF IRELAND TOPOGRAPHICAL FILES

The Duty Officer of the National Museum of Ireland carried out a search of the topographical files of the National Museum of Ireland for the townlands of Carrigdownane Upper and Lisnagoorneen on the 14th June 2022. No archaeological objects have been recorded for either townland.

10.4.9 ARCHAEOLOGICAL HERITAGE

National Monuments

No National Monument either in the ownership or guardianship of the State or of Cork County Council is located in proximity to the existing quarry or to the proposed quarry extension.

Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR)

No recorded archaeological monuments are sited within the existing quarry pit or the proposed extension area. One recorded archaeological monument is located c. 35m to the south of the existing quarry, within the tyre recycling compound, ringfort-rath (CO026-024----). The Zone of Notification for this recorded ringfort-rath extends across the existing quarry access road, which forms part of the proposed development. There is no visible surface trace of ringfort-rath (CO026-024----).

There are sixteen recorded archaeological monuments within a 1km study area of the existing quarry and proposed extension area (www.archaeology.ie, accessed 03/04/2023). A second ringfort-rath (CO026-025----) is also located in close proximity, at c. 117m to the south-east. Sited to agricultural land, outside and to the south-east the tyre recycling compound, there is no visible surface trace of ringfort-rath (CO026-025----).

The proposed development is in close proximity to the extensive prehistoric earthwork, the Claidh Dubh or the Black Ditch (CO018-001----; CO026-099----; CO034-055---- linear earthwork). This linear earthwork is located *c.* 1.1km to the west, just outside the 1km study area. It runs for 22km north-south across North Cork from the Nagles Mountains in the south to the Ballyhoura Mountains in the north. The existing quarry and proposed extension area is positioned close to the mid-way point of the earthwork. During a landscape study by The Discovery Project, the Ballyhoura Hills Project, it was evidenced that townland boundaries, radiating to the east and west of the earthwork, respected the line of the Claidh Dubh

Recorded archaeological sites within a 1km radius of the existing quarry and proposed extension area are listed in **Table 10.1** and their locations relative to the site are shown in **Figure 10.9**.

Table 10.1: Recorded archaeological sites within a 1km radius of the existing quarry and proposed extension area.

RMP No.	Class	Townland	ITM Reference	Prox. (m), Direction
CO018-092001	Graveyard	Carrigdownane Lower	573076, 607271	669m, NE
CO018-092002	Church	Carrigdownane Lower	573080, 607268	669m, NE
CO018-098	Designed landscape - belvedere	Carrigdownane Lower	573055, 607500	821m, NE
CO019-079	Kiln - lime	Derryvillane	573258, 607560	997m, NE
CO026-020	Ringfort - rath	Ballynahalisk	571298, 607118	569m, NW
CO026-021	Ringfort - rath	Ballynahalisk	571435, 606851	288m, NW
CO026-022001-	Moated site	Lisnagoorneen	571165, 605950	759m, SW
CO026-022002	Souterrain	Lisnagoorneen	571165, 605950	759m, SW
CO026-023	Ringfort - rath	Lisnagoorneen	571407, 605706	850m, SSW
CO026-024	Ringfort - rath	Carrigdownane Upper	572257, 606579	35m, S
CO026-025	Ringfort - rath	Carrigdownane Upper	572479, 606481	117m, SE
CO026-026	Enclosure	Carrigdownane Upper	572587, 606104	504m, SE
CO026-027	Ringfort - rath	Carrigdownane Upper	573074, 606678	475m, ESE
CO026-128	Kiln - lime	Carrigdownane Upper	573074, 606678	475m, ESE
CO026-210	Enclosure	Lisnagoorneen	570866, 606286	824m, WSW
CO026-243	Enclosure	Lisnagoorneen	572023, 605778	742m, S

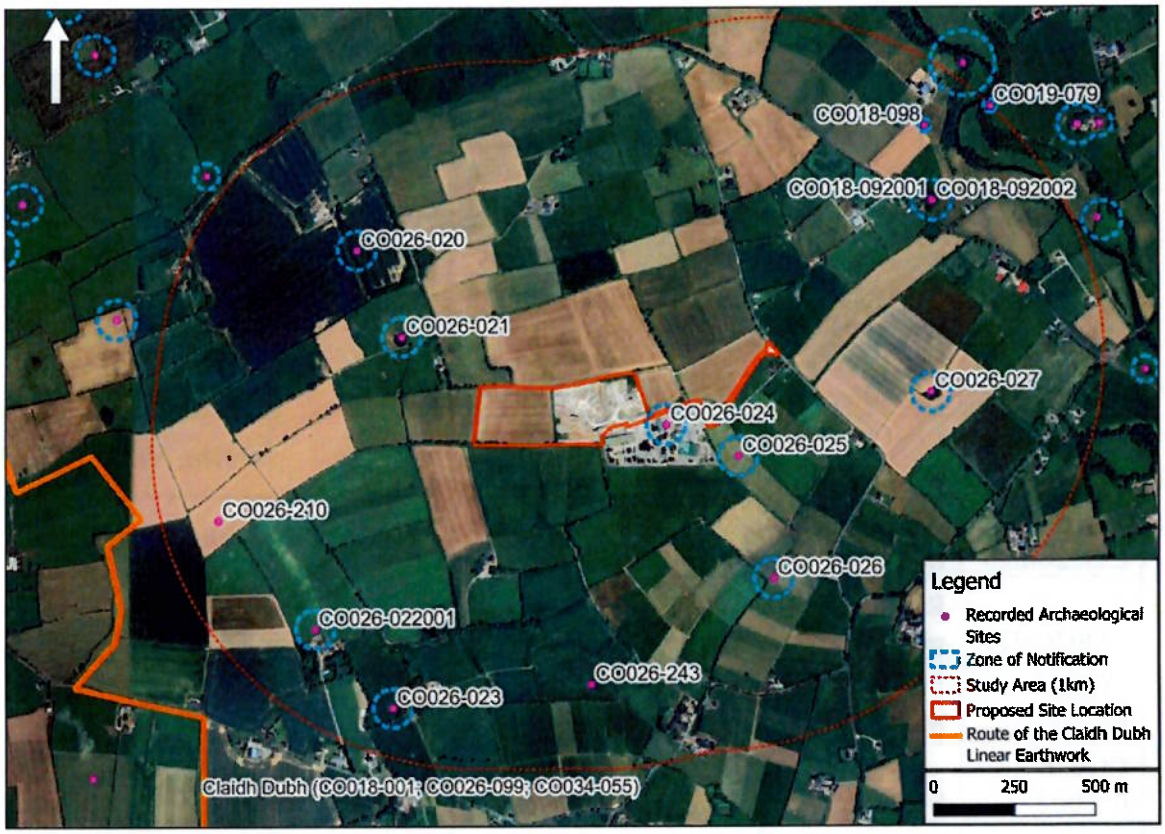

Figure 10.9: Location of recorded archaeological sites within 1km study area, and the location of the Claidh Dubh Earthwork.

10.4.10 ARCHITECTURAL AND CULTURAL HERITAGE

Record of Protected Structures

No sites listed in the Record of Protected Structures (RPS) are sited to the existing quarry or proposed extension area. There are two sites listed in the Record of Protected Structures within the 1km study area. These structures are located along, or within a short distance of the River Funshion, to the north-east of the existing quarry and proposed extension area, associated with the house and demesne at Stannard's Grove.

RPS sites within a 1km radius of the existing quarry and proposed extension area are listed in in **Table 10.2**, and their locations relative to the site are shown in **Figure 10.10.**

Table 10.2: RPS sites within a 1km radius of the existing quarry and proposed extension area.

RPS Ref.	Townland	Structure Name	Proximity (m)
85	Carrigdownane Lower	Stanards Grove Country House	946m
86	Carrigdownane Lower	Stanards Grove Rustic Obelisk	821m

National Inventory of Architectural Heritage

No sites listed in the National Inventory of Architectural Heritage (NIAH) are sited to the existing quarry or proposed extension area. There are two sites located within the 1km study area. Similar to the RPS sites, these sites are located within a short distance of the River Funshion, to the north-east of the proposed quarry extension, associated with the house and demesne at Stannard's Grove.

NIAH sites within a 1km radius of the existing quarry and proposed extension area are listed in **Table 10.3**, and their locations relative to the site are shown in **Figure 10.10.**

Table 10.3: NIAH sites within a 1km radius of the existing quarry and proposed extension area.

NIAH Reg.	Name	Townland	Rating	Proximity (km)
20901824	Stannard's Grove, gates etc.	Carrigdownane Lower	Regional	1.3km
20901825	Stannard's Grove, obelisk	Carrigdownane Lower	Regional	1.5km

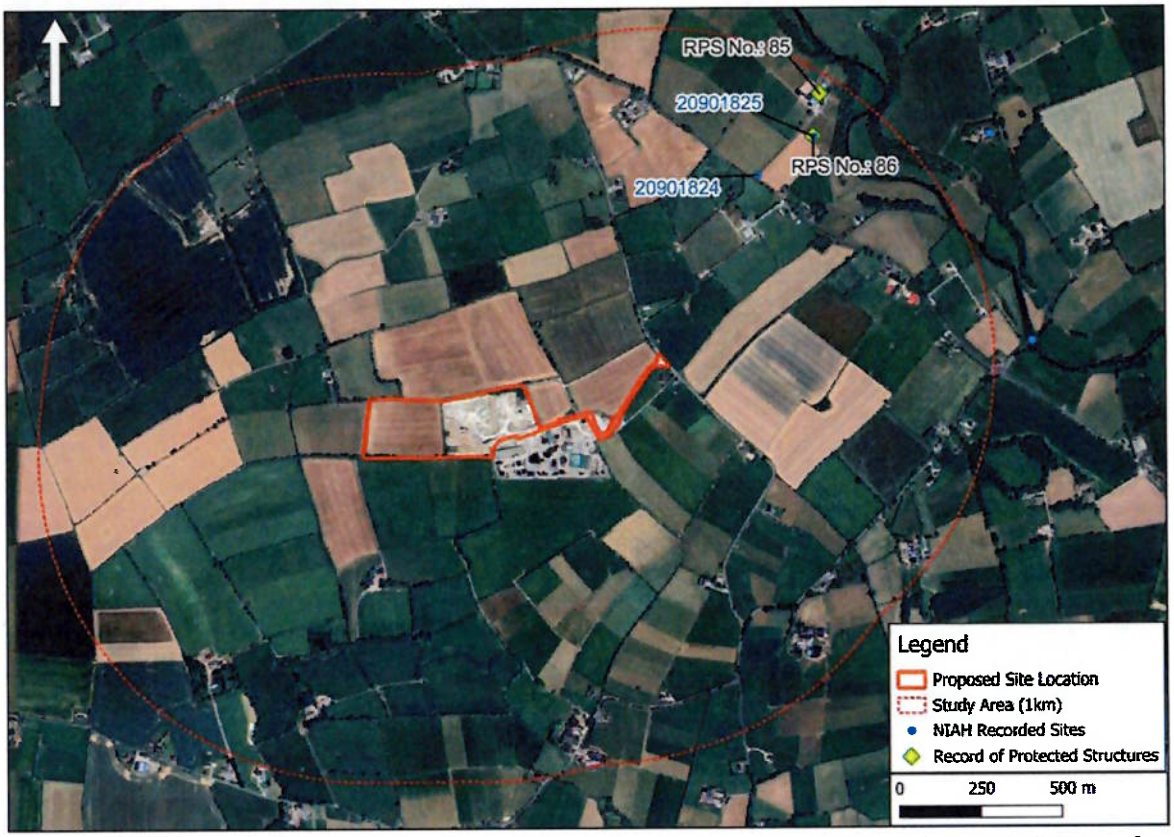

Figure 10.10: Sites listed within the Record of Protected Structures and NIAH Survey for County Cork within the 1km Study Area

10.4.11 ON-SITE INSPECTION

A site inspection of the existing quarry and proposed extension area was conducted by Fiona Reilly, Shanarc Archaeology Ltd., on 9th June 2022. The existing Rockmills Limestone Quarry is located to the north of a large tyre recycling compound (**Figure 10.11**). The quarry is accessed along a narrow road from the east which it shares with the tyre facility. The quarry serves as a limestone extraction quarry. The current quarry is approximately 10-18m deep (**Plate 10.1**). The proposed quarry extension is to include the entire field to the west of the current quarry.

The perimeter of the current quarry is variable, comprising on its south boundary a metal fence where it bounds the tyre recycling compound, and further to the west, a mature hedgerow boundary bank aligned on the townland boundary. This substantial hedgerow almost completely hides the quarry from view from the south. The western, northern and eastern boundaries are delineated by large berms measuring *circa* 4m-5m wide at the base and 2m wide at the top. The berms are planted with sycamore saplings on top, and some oak has been planted lower down on the exterior faces. It is proposed to build a 2m high by 6m wide planted berm along the perimeter of the proposed quarry extension.

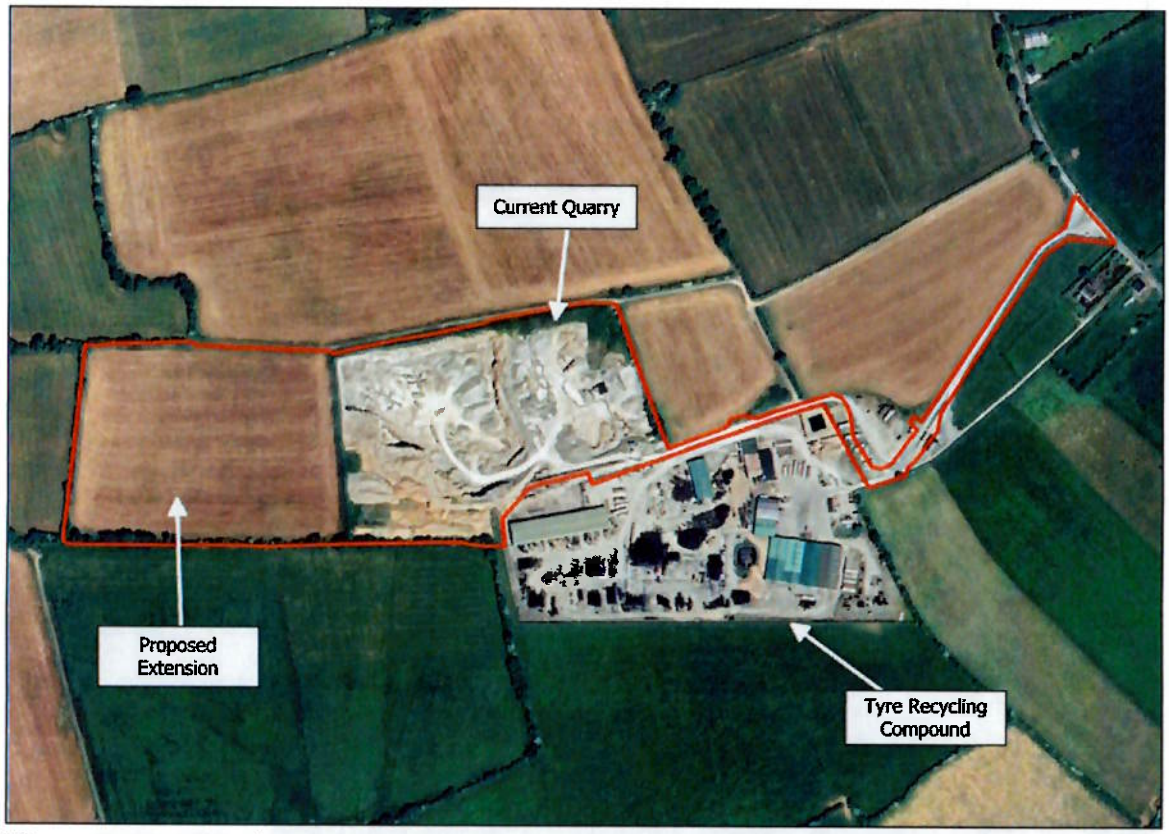

Figure 10.11: Location of current quarry and tyre recycling compound in relation to proposed quarry extension (in red) (Basemap: Google Earth Historical Imagery dated 6/2021).

The field where the proposed extension is to be located (**Plates 17.2, 17.3, 17.4**) is accessible from an existing access road that runs along the northern boundary of the existing quarry and proposed extension area. The eastern boundary with the existing quarry is delineated with a berm (**Plate 17.8**). The remaining boundaries were well established hedgerow banks, part of the northern, and whole of the western and southern hedgerows being aligned on the townland

boundary. Generally the ground surface was flat, except for the north-western corner where the land fell away into a large depression.

No above ground features of potential archaeological significance were encountered at the time of this field inspection.

Site Inspection Plates

Plate 10.1: Current quarry, looking north-west (Shanarc Archaeology Ltd.).

Plate 10.2: View across proposed extension area from the north-western corner looking south-east; current quarry is visible in the center background (Shanarc Archaeology Ltd.).

Plate 10.3: View of proposed extension area from midway along the northern boundary, looking east along the access road on the northern boundary (Shanarc Archaeology Ltd.).

Plate 10.4: View of hedgerow forming townland boundary on western boundary of proposed extension area, looking south-south-west (Shanarc Archaeology Ltd.).

Plate 10.5: View of south side to hedgerow forming townland boundary between Carrigdownane Lower and Lisnagoorneen, looking north-east (Shanarc Archaeology Ltd.).

Plate 10.6: View of western berm of current quarry to right of image, looking north-east (Shanarc Archaeology Ltd.).

10.4.12 INVENTORY OF ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE AND FEATURES, INCLUDING AREAS OF ARCHAEOLOGICAL POTENTIAL

No recorded archaeological monument, or potential unrecorded archaeological monument, and no structure listed in the RPS and NIAH have been identified within the existing quarry pit or the proposed extension area. The existing, operating quarry access road is aligned in the Zone of Notification of a recorded ringfort-rath (CO026-024----), which is situated in the adjacent tyre recycling compound. The Zone of Notification is identified as an area of archaeological potential (AP3).

Though not regarded as monuments, townland boundaries are an important cultural and social element in the Irish landscape. It is thought that the locations of some have their origins in prehistory, and it has been observed that townland boundaries in the surrounding landscape respect the line of the prehistoric linear earthwork known as the Claidh Dubh, which runs just over 1km to the west of the existing quarry and proposed extension area. Other townland boundaries have their origins in the early medieval period. The townland boundary (CHF1) between Carrigdownane Upper and Lisnagoorneen is aligned to the north-west, west and south sides of the proposed extension area, corresponding with the existing boundary ditches, banks and hedgerow. The existing hedgerow boundaries date prior to the mid-19th century as they are depicted in the 1st edition 6-inch OS map (**Figure 10.5**).

Research at the National Museum of Ireland has found that deposition of votive offerings often occurred at boundaries, especially on those of baronies and parishes (Kelly 2006).

There is potential, therefore for archaeological artefacts or older boundary systems to be uncovered (AP1).

This area of Co. Cork is rich in ringforts, many of which have no surface trace. Their presence indicates a high rural population in the early medieval period. Though no surface trace of archaeological monuments was noted from desk-based research and during field inspection, it is not possible to entirely rule out the occurrence of subsurface archaeological monuments existing in the area of the quarry extension, particularly given the proximity to ringfort site CO026-024---- (AP2).

Identified Cultural Heritage features are listed in **Table 10.4** and Areas of Archaeological Potential are listed in **Table 10.5**. Their locations relative to the existing quarry and proposed extension area are shown in **Figure 10.12**.

Table 10.4: Cultural heritage features relating to the existing quarry and proposed extension area.

Cultural Heritage Feature No.	Type	Location	Significance
CHF 1	Townland boundary	Existing NW, W and S boundary of proposed quarry extension.	Potential to be of considerable age, an important element in the Irish landscape and social history of an area.

Table 10.5: Areas of Archaeological Potential relating to the existing quarry and proposed extension area.

Archaeological Potential No.	Type	Location	Significance
AP1	Townland boundary	Existing NW, W and S boundary of proposed quarry extension.	Possible ancient boundary and location of votive offerings or earlier boundary elements.
AP2	Subsurface archaeological features	Across the proposed quarry extension footprint.	Possible subsurface archaeological remains.
AP3	Subsurface archaeological features	Across the existing quarry access road	Possible subsurface archaeological remains in Zone of Notification of recorded monument, ringfort-rath (CO026-024----).

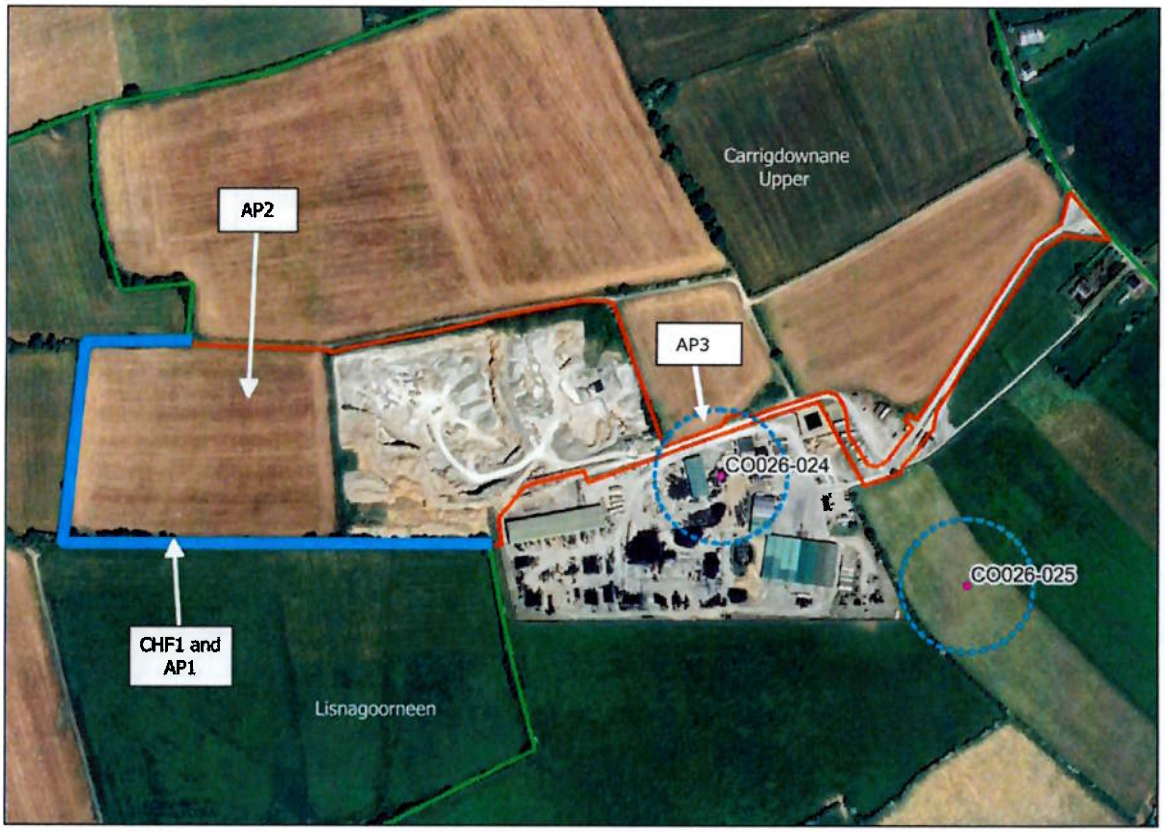

Figure 10.12: Location of townland boundary CHF1 and AP1 (highlighted in blue) and areas of archaeological potential AP2 and AP1.

10.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A full description of the proposed project is detailed in **Chapter 2** of the EIAR.

The construction phase is defined as the works required in preparing the proposed quarry extension for extraction. It is envisaged that the construction phase will take the form of:

1. Retain all existing hedgerows.
2. Strip topsoil/overburden within proposed quarry extension area and create earth berms around the proposed quarry extension working area.
3. Stockpile any excess topsoil/overburden within quarry floor.
4. Plant berms with grass for soil stabilisation.
5. Plant berms or supplementary plant existing hedgerows with native tree species.
6. Continue existing western working face to proposed site boundary.
7. Implement phased restoration of extracted areas.
8. Complete Restoration plan.

10.6 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

10.6.1 CONSTRUCTION PHASE

10.6.1.1 Potential Direct Effects

The proposed quarry extension will not directly affect any known recorded monuments or any recorded structures of architectural or built heritage interest.

The proposed development states to retain all existing hedgerows. This eliminates potential direct, permanent and negative effect to the existing townland boundary (CHF1 and AP1). There will be a reduction in the landscape setting of the townland boundary for the duration of construction, which is not significant.

The proposed quarry extension will have a direct, permanent and negative effect on any unknown subsurface archaeological features that may be present across the site (AP2).

The permitted quarry access road goes through the Zone of Notification for recorded ringfort-rath (CO026-024----). It is proposed to continue the use of this road as part of this application. Notably, other than continuation of use, works to the road are not proposed. As a result, there will be no direct, permanent and negative effect on any unknown subsurface archaeological features associated with the ringfort-rath (AP3).

10.6.1.2 Potential Indirect Effects

No indirect effects on archaeological, architectural and cultural heritage have been identified within the area of the proposed development.

10.6.2 OPERATIONAL PHASE

10.6.2.1 Potential Direct Effects

As the proposed development is to retain all existing hedgerows, including those representing existing townland boundary (CHF1 and AP1), no direct effects on archaeological, architectural and cultural heritage have been identified. There will be a reduction in the landscape setting of the townland boundary for the duration of operation, which is not significant. Other than the continuation of use of the existing quarry access road, no operational phase effects on the Zone of Notification for recorded ringfort-rath (CO026-024----) is identified.

10.6.2.2 Potential Indirect Effects

No indirect effects on archaeological, architectural and cultural heritage have been identified within the area of the proposed development.

10.6.3 CUMULATIVE EFFECTS

The proposed quarry extension is situated to the west of the existing Rockmills Limestone Quarry. The footprint of the facility would roughly double in the event that the proposed extension is made operational. If current field boundaries are maintained and replacement berms can be established fit for purpose without significantly overshadowing the existing boundaries, the cumulative effect on the cultural landscape will be minimised. If current field boundaries are removed along the length of the proposed quarry extension a significant proportion of the townland boundary between Lisnagoorneen and Carrigdownane Upper will have been removed. This would not only have a significant effect on the appearance of the landscape but would erode an important social division within the landscape. The permanent removal of the townland boundary would also impact upon the wider landscape setting of the prehistoric earthwork, the Claidh Dubh or the Black Ditch, which stretches for 22km north-south across the landscape north of the River Blackwater.

10.6.4 "DO- NOTHING" EFFECTS

If the proposed quarry extension were not carried out any potential subsurface archaeological remains would be preserved *in-situ* and there would be no change in landscape setting.

Table 10.6: Summary of Effects

Impact Phase	Feature/Site/ Structure	Probability of Effects	Impact	Quality of Effects	Significance of Effects	Extent of Effects	Duration of Effects	Mitigation	Residual Impact
Construction	**CHF1** Townland boundary.	Unlikely effects	None	Neutral effects	Not significant	Local	Long-term	Retention of existing field and townland boundary.	Townland boundary is scheduled to be left intact. There will be minimal effect on it.
	AP1 Area of Archaeological Potential relating with townland boundary.	Unlikely effects	None	Neutral effects	Not significant	Local	Long-term	Retention of existing field and townland boundary.	Townland boundary is scheduled to be left intact. There will be minimal effect on it and any potential earlier townland boundary features and archaeological objects.
	AP2 Area of archaeological potential across the proposed quarry extension footprint.	Likely effects	Direct impact	Negative effects	Profound	Unknown	Permanent	Geophysical survey followed by a programme of archaeological test trenching.	Preservation *in-situ* may be possible, or preservation by excavation and record.

Impact Phase	Feature/Site/ Structure	Probability of Effects	Impact	Quality of Effects	Significance of Effects	Extent of Effects	Duration of Effects	Mitigation	Residual Impact
	AP3 Area of archaeological potential in Zone of Notification of recorded monument, ringfort-rath (CO026-024----).	Unlikely effects	None	Neutral effects	Not significant	Regional	Permanent	Retention of existing access road with no additional upgrade or groundworks. Archaeological monitoring in the event of unplanned groundworks.	None

Impact Phase	Feature/Site/ Structure	Probability of Effects	Impact	Quality of Effects	Significance of Effects	Extent of Effects	Duration of Effects	Mitigation	Residual Impact
Operation	**CHF1**	Unlikely effects	None	Neutral effects	Not significant	Local	Long-term	Retention of existing field and townland boundary.	Townland boundary is scheduled to be left intact. There will be minimal effect on it.
	AP1 Area of Archaeological Potential relating with townland boundary	Unlikely effects	None	Neutral effects	Not significant	Local	Long-term	Retention of existing field and townland boundary.	Townland boundary is scheduled to be left intact. There will be minimal effect on it and any potential earlier townland boundary features and archaeological objects.

Impact Phase	Feature/Site/ Structure	Probability of Effects	Impact	Quality of Effects	Significance of Effects	Extent of Effects	Duration of Effects	Mitigation	Residual Impact
	AP3 Area of archaeological potential in Zone of Notification of recorded monument, ringfort-rath (CO026-024----).	Unlikely effects	None	Neutral effects	Not significant	Regional	Permanent	Retention of existing access road with no additional upgrade or groundworks. Archaeological monitoring in the event of unplanned groundworks.	None

10.7 MITIGATION MEASURES

Mitigation measures are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Act 1930 (as emended), the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Acts 2000 (as amended). It is an objective of the Council to protect and preserve previously unrecorded archaeological sites within County Cork as part of any development proposals. The Council will require preservation *in-situ* to protect archaeological monuments discovered. Preservation by record will only be considered in exceptional circumstances (Objective HE 16-13).

10.7.1 PRE-CONSTRUCTION PHASE

10.7.1.1 Avoidance of Effects

Avoidance of direct effects on the archaeological, architectural and cultural heritage resource identified in relation to the proposed development is the preferred mitigation option.

1. The townland boundary (CHF1/AP1) that corresponds with the existing field boundaries are to be retained as part of the proposed development. Any required berm formation should be considered to avoid significantly overshadowing the townland boundary. In the event that the townland boundary cannot be avoided, the boundary should be recorded by an archaeological survey and any earthworks in close proximity should be subject to archaeological monitoring.

2. In order to better ascertain the archaeological potential of the footprint of the proposed extension area (AP2), the proposed quarry extension area should be subject to a geophysical survey followed by targeted test trenching. If archaeological monuments are identified at this stage, their preservation *in-situ* should be considered during the planning phase.

3. No upgrade or other groundworks are proposed in relation to the existing permitted quarry access road, avoiding any potential direct, negative and permanent effects on potential subsurface archaeology associated with recorded monument, ringfort-rath (CO026-024----) (AP3).

10.7.1.2 Geophysical Survey and Archaeological Test Excavation

It is recommended that pre-construction geophysical survey and archaeological test excavation be undertaken to address the subsurface archaeological potential of the proposed quarry extension (AP2). Pre-construction archaeological test excavation will target areas of archaeological potential identified by the geophysical survey. Pre-construction archaeological test excavation will also target the townland boundary (AP1) in the event of its removal; however, the hedgerows are stated to be retained in full. Archaeological testing should be undertaken well in advance of the construction phase. This will allow a satisfactory timeframe in which the mitigation measures can be undertaken and the results assessed without causing construction delays.

This work must be carried out under licence in accordance with Section 26 of the National Monuments Act 1930 (as amended), and with a method statement agreed in advance with the National Monuments Service (Department of Housing, Local Government and Heritage) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation *in-situ*, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during test trenching. It is envisaged that the following will apply:

i. Should investigation yield evidence of archaeologically significant material or structures, preservation *in-situ* may be recommended. Strategies for the *in situ* preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation through redesign.

ii. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved *in-situ*, archaeological excavation and recording, to full resolution, is recommended.

iii. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

10.7.2 CONSTRUCTION PHASE

10.7.2.1 Archaeological Monitoring

In the event that the townland boundary CHF1/AP1 is not preserved *in-situ*, it is recommended that archaeological monitoring be undertaken of its removal. In the event that unplanned groundworks are required at the existing quarry access road, groundworks in the Zone of Notification of recorded monument ringfort-rath (CO026-024----) (AP3) will be archaeologically monitored. The extent of further archaeological monitoring at the construction phase will be informed by the results of pre-construction geophysical survey and archaeological testing.

It is envisaged that the following will apply:

i. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.

ii. Should archaeological features or material be uncovered during the construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

iii. This work must be carried out under licence in accordance with Section 26 of the National Monuments Act 1930 (as amended), and with a method statement agreed in advance with the National Monuments Service (Department of Housing, Local Government and Heritage) and the National Museum of Ireland.

10.7.3 OPERATION PHASE

If all topsoil removal and required groundworks are completed during the construction phase, there will be no effects on the archaeological, architectural and cultural heritage during the operational phase. No operational phase mitigation is recommended in the event pre-construction and construction phase mitigation is carried out in full.

10.8 RESIDUAL EFFECTS

Residual effects are the degree of environmental change that will occur after the proposed mitigation measures have taken effect. The townland boundary (CHF1/AP1) is scheduled to be preserved *in-situ*, and there will be no residual effect on the townland boundary between Carrigdownane Upper and Lisnagoorneen. If current field boundaries are maintained and replacement berms can be established fit for purpose without significantly overshadowing the existing boundaries, the residual effect on the cultural landscape will be minimised. Currently the existing hedgerow, where present, blocks the view of the quarry operation from the surrounding landscape very well. No groundworks are to take place on the existing quarry access road in the Zone of Notification of recorded monument ringfort-rath (CO026-024----) (AP3), and there will be no residual effect on the recorded monument.

10.9 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered in compiling information for this report.

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https://heritagemaps.ie	Cultural heritage datasets
www.logainm.ie	Placenames database
www.downsurvey.tcd.ie	Down Survey maps
www.buildingsofireland.ie	NIAH website listing recorded architectural sites
www.jstor.org	Journal articles, books and primary sources
www.libraryireland.com	Samuel Lewis, A Topographical Dictionary of Ireland
https://dcenr.maps.arcgis.com	LiDAR data https://webapps.geohive.ie Aerial imagery
https://www.corkcoco.ie	County Development Plan
https://www.epa.ie	EIAR Guidelines 2022
https://discoveryprogramme.ie	Ballyhoura Hills-Project
https://uis.unesco.org	UNESCO Definitions on Cultural Heritage

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SECTION D - MATERIAL ASSETS

This section of the Environment Impact Assessment Report deals with material assets that would potentially be affected by the proposed continuation and extension of an existing quarry, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork.

Material Assets: **Natural and Other Resources** including mineral resources and land.

Material Assets: **Utilities** (including Electricity, Water and Traffic).

Material Assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

11.0 MATERIAL ASSETS – NATURAL & OTHER RESOURCES

11.1 INTRODUCTION

This chapter outlines the potential impacts on natural and other resources of the proposed continuation and extension of an existing quarry, together with all ancillary site works and services, in the townland of Carrigdownane Upper, Co. Cork.

This chapter also outlines the potential agricultural impact of the proposed development.

11.2 METHODOLOGY

The desktop survey assessed potential impacts using statistical information from the CSO (Central Statistics Office) and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, Geological Survey Ireland Spatial Resources, Teagasc Subsoil Mapping, EPA Envision, CORINE land use mapping and myplan.ie.

11.3 DESCRIPTION OF EXISTING RESOURCES

The area in the immediate vicinity of the proposed operation is rural in nature, with much of the land in agricultural use. However, a network of utilities associated with residential houses, agricultural and commercial operations are all available in the general hinterland.

11.3.1 LAND USE AND SOIL

As shown in the following Corrine land use map below, the dominant existing land use in the area of the proposed development is agricultural pasture.

The total proposed extension area is 4.21 ha, which includes the proposed 3.84 hectare excavation area extension, earth berms and boundaries.

Further details of soils, subsoils and geology are provided in **Chapter 9**. The Howardstown Unit is mapped beneath the existing and proposed development site. The Howardstown Unit consists of clayey drift with limestones and is considered a deep well-drained mineral soil.

Previous and current trial digging has found overburden depths of 500mm to 1000mm across the proposed excavation areas. Assuming an average overburden depth of 750mm, the following estimated quantities of overburden would be available for reinstatement:

Table 11.1: Estimated stockpiled overburden volumes

Phase	Extraction Area (ha)	Overburden Volume (m3)
Existing Areas	4.718	35,385
Proposed Extraction	3.84	28,800
Total	**8.558**	**64,185**

There would be no import or export of soils from the site. Excavated overburden would be used in the establishment of boundary earth berms or stockpiled onsite for the rehabilitation phases of the development.

Figure 11.1: Corine Land Use 2018 (Source: EPA Maps)

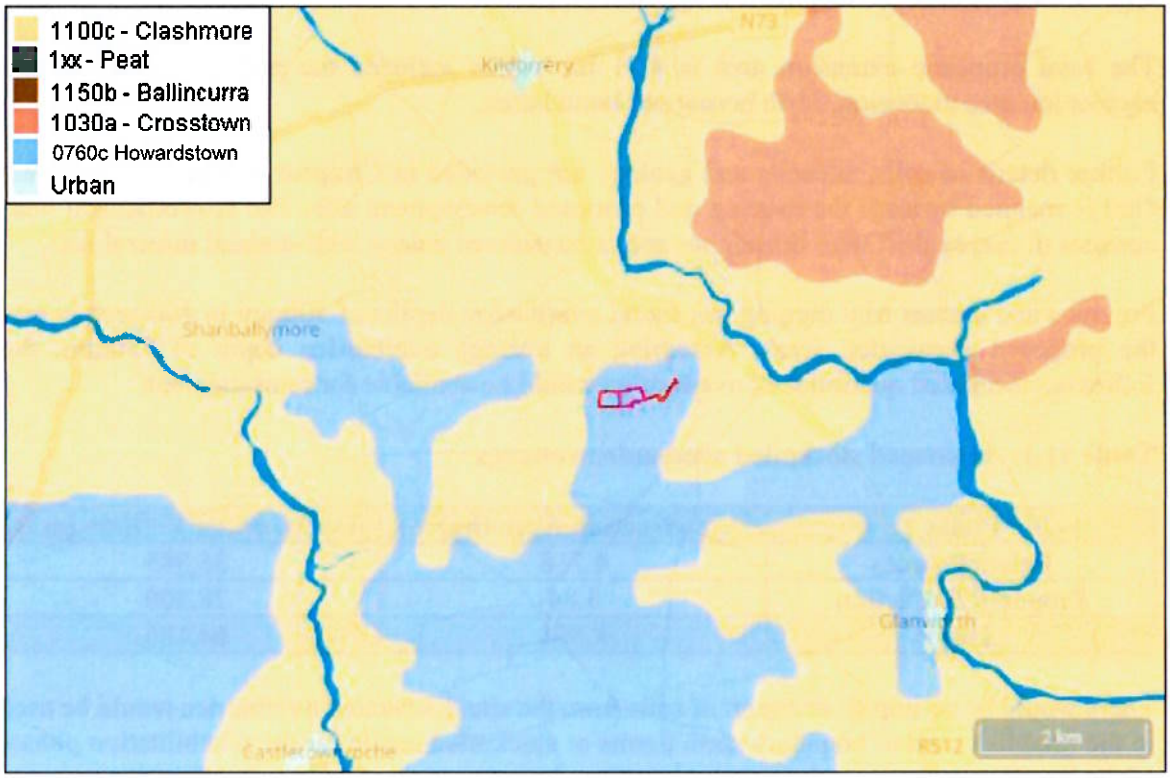

Figure 11.2: SIS National Soils (EPA Maps)

11.3.2 ECONOMIC MINERALS

The GSI Quarry & Mineral Database was consulted. Registration of quarrying activities with the GSI is not mandatory, and therefore the database may not be a true representation of the economic geology in the area. The GSI Mineral Database contains records of the following mineral locations:

- A limestone quarry in the townland of Kilnadrow, Glanworth. The mineral locality is c. 4.5 km east of the proposed development.
- A sandstone quarry in the townland of Gortnahown. The mineral locality is c. 6 km east of the proposed development.
- A shale quarry pit is noted in the townland of Graigue. The mineral locality is c. 6 km north of the proposed development.
- A Roadstone limestone quarry pit is noted in the townland of Lacknamina. The mineral locality is c. 8.6 km west-south-west of the proposed development.

11.3.3 AGRICULTURE

The 2020 Census of Agriculture indicates that since the previous Census in 2010, the number of farms in County Cork has fallen by 3.64 % from 14,222 to 13,704. The average farm size in County Cork has increased slightly by from 38.2 hectares to 38.7ha.

The 2010 Census of Agriculture indicates the majority (42.2%) of farms are specialist beef production farms, 28.4% are specialist dairy, 8.5% are mixed grazing livestock, 5.6% are specialist tillage, 4.6% are specialist sheep, 7.0% are mixed field crops, 2.5% are mixed crops and grazing and the remaining 1.3% is classified as 'other'.

The CORINE data series shows that land within approximately 1km of the proposed site is primarily used for pasture – code: 231 (see **Figure 11.1**).

The CORINE data series also shows that the surrounding region is primarily occupied by pastureland. The other land cover in the region consists of land principally occupied by arable land agriculture but with areas of natural vegetation and transitional woodland scrub, discontinuous urban fabric – particularly the towns of Killdorrery and Glanworth.

The proposed site would be located within rural agricultural landscape, dominated by pasture fields of varying sizes. The fields and roads are bounded by a combination of well-established treelines, mixed hedgerows, banks, dry stonewalls, drainage ditches and fences.

Residential developments in the area are predominantly located along the existing road network. A number of farmyard complexes are located within the area. One-off residences and farmyard complexes are the dominantly visible man-made structures in the landscape.

11.3.3.1 Agricultural Enterprises

In addition to agricultural farms and holdings, multiple agricultural enterprises are located within the surrounding area of the proposed development. **Table 11.2** outlines the facilities licenced by the Environmental Protection Agency (EPA) for all classes of activity, including *'Intensive Agriculture'*, within 10km of the proposed development.

Table 11.2: EPA Licenced Facilities within 10km Proposed Development

Licence No.	Licence Name	Licence Type (First Schedule of EPA Act, 1992, as amended)	Approximate Distance from Proposed Site
P0413	Mr Patrick OKeeffe	6.2(b) Intensive agriculture	4.00 km NE
P0387	Leamcar Limited	6.2(a) Intensive agriculture	5.62 km W
P0396	Derra Farms Limited	6.2(b) Intensive agriculture	7.10 km NE
P0374	Mr Conor O'Brien	6.2(b) Intensive agriculture	7.20 km NE
P0896	Mr Liam OConnell	6.1(a) Intensive agriculture	7.57 km S
P0891	Mr Kevin Ahern	6.1(a) Intensive agriculture	8.56 km SE

11.4 IMPACTS AND MITIGATION

11.4.1 LAND AND SOIL

The soil excavated during removal of overburden would remain onsite to be used as material during the rehabilitation phase. The construction and operation phases of the development would result in the removal of an additional 3.84 ha of soil overburden, and the removal of 4.718ha of land from agricultural use.

The restoration plan under the current planning permission (PL 15/5484) would return 0.516ha of the current 2.923 ha quarry to pastureland. 0.713 ha within the extracted area would also be rehabilitated to be suitable for the development of mixed habitats.

Under the current proposed quarry extension, 1.036ha would be rehabilitated to mixed habitats. 3.332 ha would remain fallow as bare stone habitat. It is anticipated that the estimated 1.036ha of mixed habitats could be extended due to the use of non-commercial waste stone that will be generated during the quarrying process.

There would be a permanent negative impact on soil cover and pastureland from the development. As the agricultural land and farming operation is in the ownership of the applicant, it is considered that the economic benefit of the quarrying operation would offset the economic loss of the agricultural pastureland.

11.4.2 ECONOMIC MINERALS

The proposed development would be a continuation of the current quarrying activity.

It is considered that the proposed project will not to give rise to a significant reduction in the volume of resource in Cork or with the Waulsortian Formation.

The Applicant intends conserving the natural resources by maximising the resource potential by way of ensuring that the end use is maximised, thus achieving the most prudent and efficient use of this high-quality non-renewable resources.

11.4.3 RAW MATERIALS REQUIRED

There would be no significant raw material use during the construction phase, other than fuel for vehicles.

During the operation of the quarry, the current material use, primarily fuels, groundwater and electricity would continue at current rates.

There would be no significant use of materials in a regional or national context.

11.4.4 'DO-NOTHING' SCENARIO

Should the proposed development not be permitted, the current 10 year planning permission (15/5484) would lapse in 2025. Onsite operations, including material use characteristics, would continue within this time frame until the available stone resource is exhausted.

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12.0 MATERIAL ASSETTS –TRAFFIC

12.1 INTRODUCTION

This chapter outlines the utilities that would potentially be affected by the proposed development during both the construction and operational phases. Material assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin.

The objective of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Economic assets of human origin, i.e. utilities and transport network are considered in this chapter. Economic assets of natural origin are addressed in other chapters of this EIAR, namely: **Chapter 8:** *Biodiversity – Terrestrial and Aquatic Environment;* **Chapter 9***:Land - Soils, Geology and Hydrogeology; and* **Chapter 11***:Material Assets –Natural & Other Resources*. The purpose of this chapter is to assess the impacts of the proposed development on the existing utility network, which includes the following infrastructure:

- Electricity;
- Water;
- Transport Network

12.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the utilities within the area.

A road and traffic survey report was prepared in March 2023 by Murphy McCarthy Consulting Engineers for this development, and is included as **Attachment 12.0** of this EIAR. Traffic counts were carried out on Tuesday 21st June 2022 to inform this assessment. This report has been summarised within this chapter.

12.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

12.3.1 ELECTRICITY

There are multiple power line systems within the vicinity of the site.

Electricity supply and transmission is available throughout the county on the low (38kV, 20kV, and 10kV) and high transmission networks. High voltage transmission within the county is available at 110kV amd 220 kV.

Shannon Scheme: connecting larger towns and villages to the national grid, first began to generate electricity for the national grid in October 1929, and began to supply the larger cities, towns and villages of Ireland. From 1929, 17 towns and villages across Mayo were directly supplied by the Shannon Scheme, which included Ballyhaunis (1932-1933).

Rural Electrification Scheme: connecting rural townlands and villages to the national grid, began in 1946, to bring electricity to Ireland's rural areas, including smaller villages. During the roll-out of the scheme, Mayo was divided into 56 rural areas, which included Bekan (1953 -1954).

Since 1927, one generating station has been built in Mayo. Located about twenty miles west of Ballina in Northwest Mayo, Bellacorrick station burned locally supplied milled peat. Bellacorick station was decommissioned in 2003 and demolished in 2007.

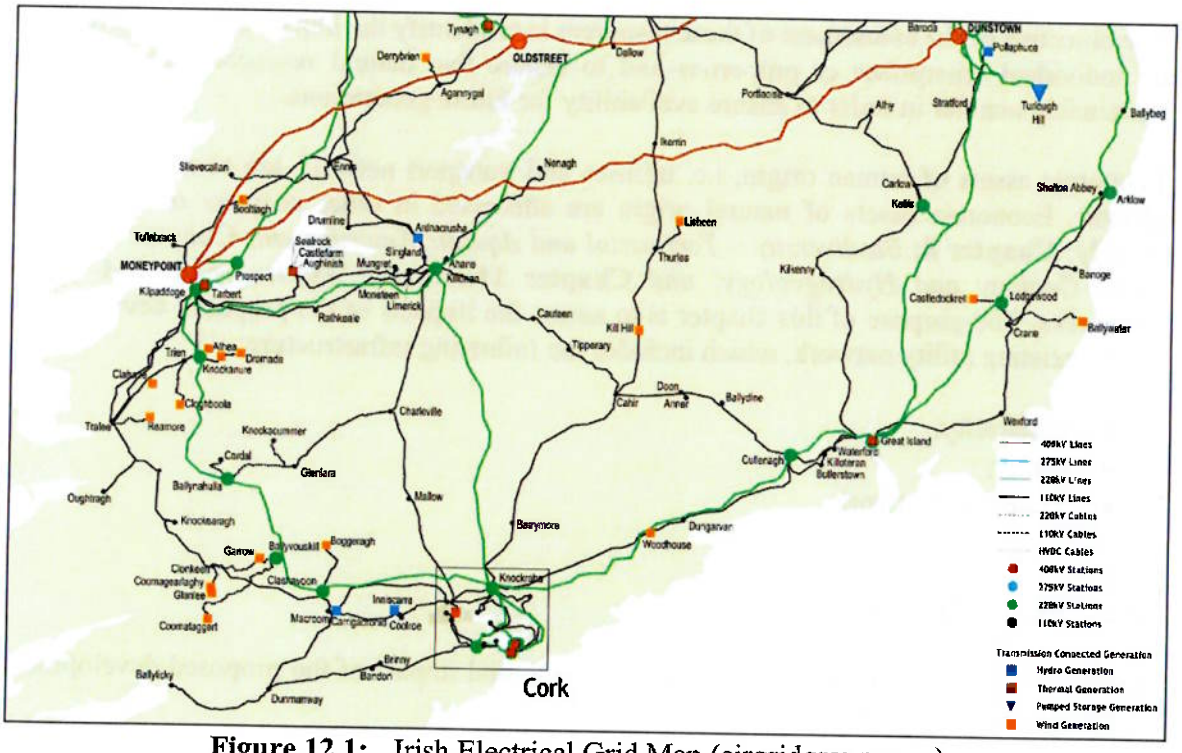


Figure 12.1: Irish Electrical Grid Map (eirgridgroup.com)

ESB's annual reports record 10 local electricity suppliers in the county.

12.3.2 WATER

There is a mains water supply within the vicinity of the proposed development.

Group Water Schemes are privately owned and operated schemes. The Group Water Schemes' Programme was introduced in 1962 to provide capital grant aid to rural dwellers for the construction of water distribution systems to pipe water from local water sources such as lakes or boreholes into their homes and farms. Communities set up voluntary co-operative structures known as Group Water Schemes to privately manage these water distribution systems with current operating costs being funded through contributions from Group Scheme members and Central Government subsidies.

There are two categories of Group Water Schemes in Ireland:

- Private Group Water Schemes which abstract, treat and distribute their own water supply from a private source such as a lake, river, well or spring. Please note that Irish Water does not have any responsibility for Private Group Water Schemes.

- Public Group Water Schemes that obtain water by a connection to a public water supply and distribute this water through a local distribution network owned and operated by the Group.

Group schemes are responsible for the provision of supplies to their customers and the maintenance of their networks irrespective of whether supplies are privately or publicly sourced

The National Federation of Group Water Schemes have collected data on Ireland's privately-managed Group Water Schemes over the last 20 years. This has been done on the ground, by the organisation's development staff, and through an annual affiliation fee form filled out by the schemes. While other data on Group Water Schemes do exist, the NFGWS dataset is considered the most complete.

Outside Counties Cavan, Mayo and Monaghan, the vast majority of group water schemes abstract their water from groundwater sources, such as boreholes and springs. Many of the groundwater schemes have a smaller number of domestic connections than do the surface water schemes. While there are many springs in the country with a high flow rate, wells and boreholes will typically have a far lower yield, meaning that less connections can be supported.

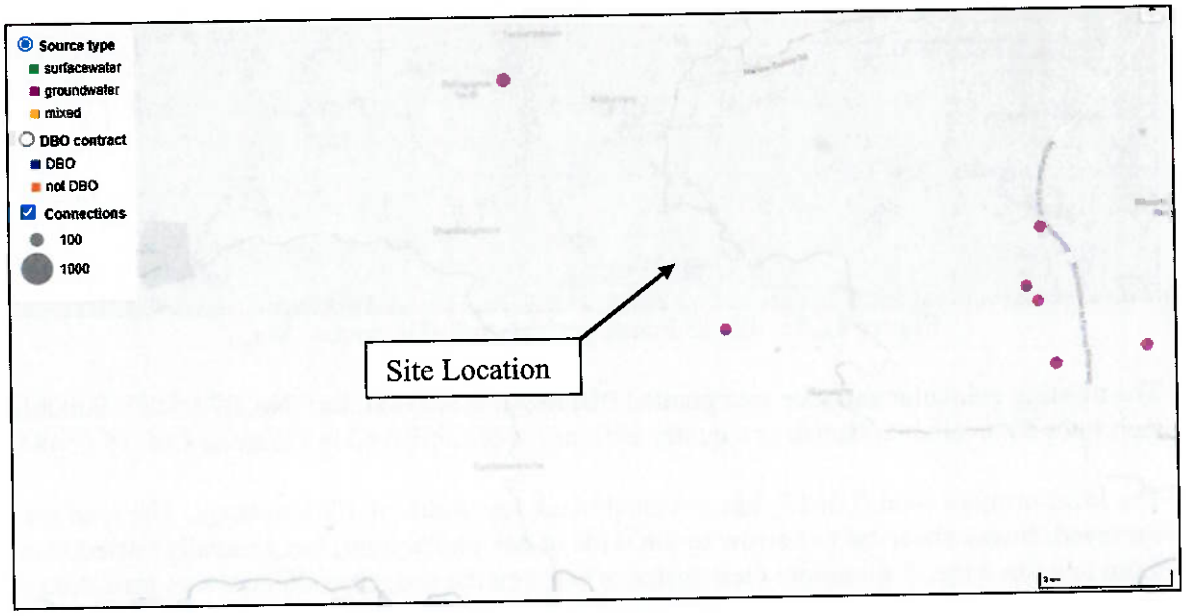


Figure 12.2: Group Water Schemes Map (nfgws.ie)

As can be seen from **Figure 12.3** there is a group water scheme serving 33 residences located to the south-east of the proposed site. However, details are limited as the scheme is not registered and does not have a Design-Build-Operate (DBO) contract with Irish Water.

12.3.3 TRANSPORT NETWORK

The existing quarry is located in the Townland of Carrigdownane Upper, Rockmills, Kildorrery, Co. Cork. The site itself has no road frontage, but is linked to the existing public road to the east of the site by an existing private concrete roadway which also serves the already existing recycling industrial facility.

The site is accessed via a private entrance road from the L5612. The quarry extraction area boundary is located approximately 420m from the L5612 road. Goods vehicles accessing and exiting the site use the L5612 to connect to the R512, connecting Killdorrery to Glanworth through Rockmills village.

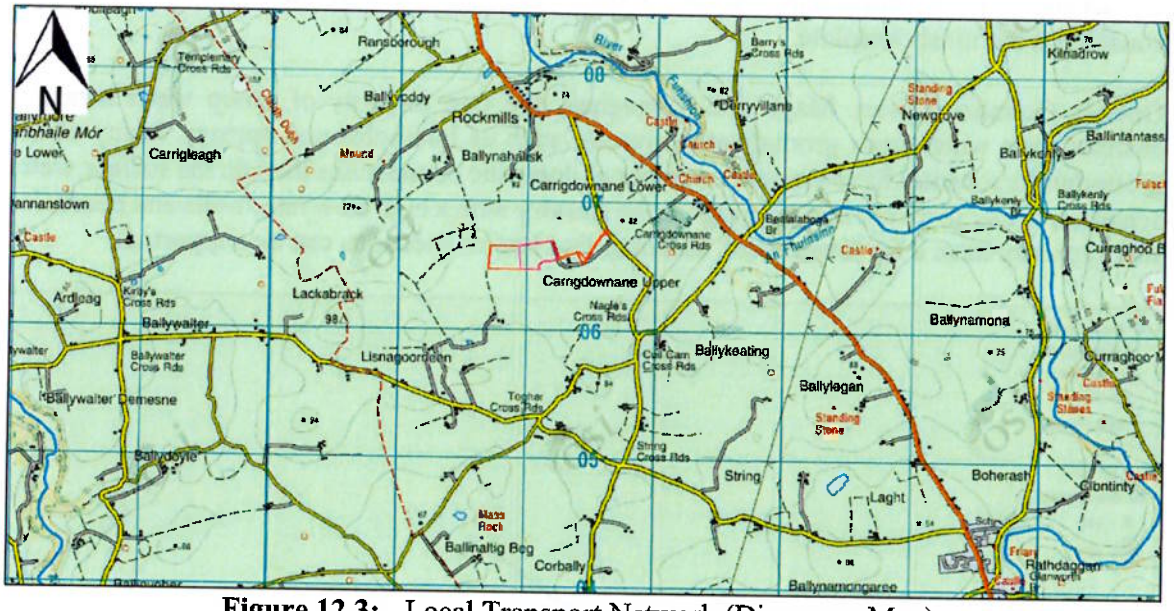


Figure 12.3: Local Transport Network (Discovery Map)

The existing vehicular entrance was granted Planning Permission, Ref. No. 07 / 5422. Suitable sightlines are available. Its use as a quarry entrance was confirmed in Planning Ref. 15 / 5484.

The local primary road (L5612) has a typical black top width of 4.7m average. The road was surveyed. It was observed to narrow to 4m wide at one pinch point, but generally varied from 4.6m to 4.9m wide. A minimum clear distance between the hedgerows/fences was measured at 6.5m, with an average clear dimension available of 7.5m

There are no public lighting, footpaths or road markings (except at the R512 junction) within the study area.

A statutory speed limit of 80km/hr governs the L5612, but in reality the actual speed is much lower and is in the order of 50km/hr

In compliance with conditions agreed with the Area Engineer re Planning Permission Ref 15 / 5484, the Local Roadway L5612 was improved to provide 5 number passing bays between the site entrance and the junction with the R512. The junction with the R512 was also upgraded to provide the necessary safe sightlines.

A traffic count was undertaken at the site entrance on Tuesday 21st June 2022 between 7am and 9.30am. Because of the rural nature of the site, most of the surrounding land use being agricultural, there are no seasonal peak factors affecting traffic flow as there would be on a commuter, urban or tourist route. The results of the traffic count are shown summarised on Drawing No. 221099-21 attached.

The count indicated approx. 55 traffic movements over a two and a half on the L5612 with an approximate 35% HGV content.

On the L5612, north of the site entrance 55 vehicle movements were observed over a two and a half hour period, and 44 vehicle movements to the south of the site entrance. On this road the average HGV content north of the site entrance was 8 no. per hour and south of the entrance 4 no. per hour

From local knowledge and in keeping with local land uses in the area, a milk lorry, an animal feed lorry, an oil lorry, some farm machinery and lorries from the Crossmore Tyre Recycling facility together with the quarry traffic, regularly use the local L5612 road, without any reported difficulties.

There is no traffic accident history on L5612.

In order to estimate the capacity of the road network, Murphy McCarthy Consulting Engineers consulted: RT180 – Geometric Design Guidelines (Classification, Alignment, Cross Section). For a Level of Service "C" undivided rural road with 0.0% sight distance greater than 460m, Table C4.2 estimates the capacity of a 5.0m wide carriageway as being 550 passenger car units per hour (pcu/hr)* in two directions.

Based on the traffic count survey, the existing traffic use was determined to be 35 pcu's per hour.

12.4 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

12.4.1 WATER AND ELECTRICITY NETWORK IMPACTS

All electricity for the existing quarry is provided by an onsite diesel generator. There would be no increase in electricity usage as part of the development. There would be no impact upon the local electrical grid as a result of the proposed development.

All water for the existing quarry is provided by two onsite groundwater wells. There would be no increase in water usage as part of the development. There are no third party supply wells within the vicinity which would be impacted by the site groundwater abstractions. There would be no impact upon the local water supply as a result of the proposed development.

12.4.2 TRAFFIC

It is proposed to retain and extend the existing quarry facility, including the existing internal access roadway. The existing site entrance will be retained unchanged.

The intended average extraction rate is 150,000 tonnes per annum. Assuming a 20 tonne load per truck, and 250 working days per annum, this gives an average of 600 tons per day (30 loads per day) is expected, equivalent to 60 no. truck movements per day. Assuming a 6 hour working day minimum, the HGV traffic loading may be conservatively estimated at maximum 10 no. lorry movements per hour, or 25 pcu's / hr, of combined in and out traffic.

There are approx. 5 or 6 staff employed by Rockmills Quarries, and another 5 by Crossmore Tyres, and approx. 12 drivers. This gives a max car use of 22 entering in the morning, and the same leaving in the evening. In reality, 20 lorry drivers arrive by lorry, and staff car share, so the 13 cars counted in the traffic survey is more typical of what can be expected. The cars will tend to come to work at the same time, thus the car loading may be as high as 15 pcu's / hr.

Thus the max two traffic loading is expected to be approx. 40 pcu's / hr. This is significantly below the guideline 550 passenger car units per hour (pcu/hr) capacity of the local road network.

12.4.3 POTENTIAL CUMULATIVE IMPACTS

The existing road network has sufficient capacity to accommodate the exiting and proposed operation of the quarry and no significant cumulative traffic impacts are anticipated. There would be no cumulative impact upon local utilities.

12.5 MITIGATION MEASURES

Due to the absence of utility and traffic impacts no mitigation is required.

12.6 DIFFICULTIES ENCOUNTERS IN COMPILING INFORMATION

No difficulties were encountered during the assessment of potential impacts of the proposed development on utilities.

12.7 REFERENCES

Environmental Protection Agency (2017) Draft. Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Cork County Development Plan 2022-2028. Available at: https://www.corkcoco.ie/en/resident/planning-and-development/cork-county-development-plan-2022-2028

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

Myplan.ie Viewer. Available at: http://www.myplan.ie/viewer/

National Federation of Group Water Schemes, https://nfgws.ie/

Irelands Group Water Schemes Map, Available at: https://nfgws.ie/wp-content/uploads/2020/07/gws-map.html

Group Water Schemes, Available at: https://www.water.ie/water-supply/group-water-schemes/

SECTION E – INTERACTIONS AND INTER-RELATIONSHIPS

In line with requirements of EC Directive 85/337/EC (as amended) and the Planning and Development Regulations 2001, any interactions/inter-relationship between the various environmental factors were also taken into account as part of the EIAR scoping and assessment.

Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed. An overview of these potential interactions is provided in **Table 13.1**, with the main interactions or inter-relationships discussed in **Sections 13.1 to 13.13** below.

13.0 INTERACTIONS AND INTER-RELATIONSHIPS

Table 13.1: Summary of Potential Interactions/Inter-Relationships

Receptor / Source	Human Beings	Air	Noise	Landscape & Visual	Biodiversity	Water	Soils	Climate	Material Assets	Cultural Heritage
Human Beings		✓	✓	✓	✓	✓	✓	✓	✓	✓
Air	✓		X	X	✓	X	X	✓	✓	X
Noise	✓	X		X	✓	X	X	X	✓	X
Landscape & Visual	✓	X	X		X	X	X	X	X	✓
Biodiversity	✓	✓	✓	X		✓	X	✓	X	X
Water	✓	X	X	X	✓		X	X	X	X
Soils	✓	✓	X	✓	✓	X		X	✓	✓
Climate	✓	✓	X	X	✓	X	X		X	X
Material Assets	✓	✓	✓	X	✓	X	X	X		✓
Cultural Heritage	✓	X	X	✓	X	X	X	X	✓	

✓ - Anticipated Interaction X - No Anticipated Interaction

13.1 AIR AND SOILS

Excavations and earth moving operations during construction works may generate quantities of dust, which have the potential to impact upon air quality in the vicinity of the proposed development. Consequently, an impact upon air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna (further discussed in **Chapter 5**).

The extent of dust generation depends on the nature of the dust (soils, sands, gravels, silts etc.) and the extent of the activity. The potential for dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Mitigation measures to control dust emissions would be implemented, which would include good working practices, dust suppression measures and the undertaking of stabilisation planting as soon as practicable.

13.2 AIR AND CLIMATE

The proposed development has the potential to impact upon the air quality and climate of the area through air emissions, including potential greenhouse gases, arising from vehicle movements and energy generation.

As discussed in **Section 5**, the scale greenhouse gases potentially generated as a result of the construction and operation of the proposed quarry would be insignificant in a regional and national context.

13.3 AIR, HUMAN HEALTH AND BIODIVERSITY

An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance to humans and fauna and has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. However, as discussed in **Section 5**, the risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader regional scale.

There would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and flora and fauna in the surrounding area. The extension of the quarry would occur progressively in each phase of the project, and only a small area of soils would be exposed at any one time.

Mitigation measures to control dust emissions would be implemented, which would include good working practices, dust suppression measures and the undertaking of stabilisation planting as soon as practicable.

13.4 NOISE, HUMAN HEALTH AND BIODIVERSITY

Noise generation has the potential to impact upon human beings and fauna within the vicinity of the site. There would be anticipated to be no significant additional noise in the area of the quarry during the project lifetime.

Planning permission compliance monitoring and noise prediction calculations has determined that there is no significant impact on the existing noise environment from the quarry. As an

established activity, it is anticipated that local biodiversity would be acclimatised to the existing noise environment.

Control and mitigation measures to reduce the potential for noise and vibration are outlined in **Chapter 6.0**.

13.5 MATERIAL ASSETS AND HUMAN BEINGS

The location of the proposed quarry extension is within improved agricultural grassland. The loss of improved grassland to the footprint of the proposed development would be minor in a regional context.

There would be no increase in existing contributions to traffic volumes using the local road network.

The development would improve the economic value of the site to the applicant and maintain current employment, which would positively impact upon material assets.

13.6 MATERIAL ASSETS AND BIODIVERSITY

The proposed development would alter flora cover and the species of fauna supported due to land take and soil disturbance works. This impact would be minor due to the low ecological value of improved grassland present at the proposed site. The proposal would include the planting of native species on boundary earth berms, and restoration of a significant portion of the quarry to mixed natural habitats over the project life, resulting in a net benefit.

13.7 MATERIAL ASSETS AND NOISE

The proposed development is located in a rural agricultural area, primarily dominated by pastureland. Increased noise emissions during the construction or operational phases would have the potential to impact upon livestock due to disturbance. The potential for noise associated with the proposed development on livestock would be considered low, given that any livestock within the immediate area of the existing quarry would be acclimatised to the noise environment.

13.8 MATERIAL ASSETS AND AIR

As noted above, the proposed development is located in a rural agricultural area. The generation of dust may have a nuisance value and livestock would be at risk to eye irritation from wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression the potential for dust to impact upon material asset amenity and livestock would be considered low.

13.9 WATER QUALITY AND HUMAN BEINGS

A deterioration in groundwater quality has the potential to impact upon human beings by adversely affecting drinking water quality. There would be a potential risk water quality from the development due to storage and use of fuels and chemicals at the site. As described in **Section 2.3.2.2**, control and management measures are in place at the site. Further control measures for the appropriate management of fuels and chemicals at the site have been

recommended in **section 9.8.3**. Due to the existing and proposed mitigation measures, it is considered that there would be no significant risk to water quality or human health from the proposed development.

13.10 WATER QUALITY AND BIODIVERSITY

The primary risk from the existing and proposed development would be to the underlying groundwater body. Due to set back distances, it is unlikely that impacts to biodiversity would occur due to the interconnectivity of the underlying groundwater body and surface-waters. However the mitigation measures described in **Section 2.3.2.2**and **section 9.8.3** would ensure no significant risk to water quality or biodiversity from the proposed development.

13.11 LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS

The excavation, temporary storage and movement of soil within the site would affect the appearance of the landscape. This would be temporary as proposed planting becomes established.

Mitigation measures to minimise the visual and landscape impact of the proposed development have been proposed in **section 7.6**.

13.12 CULTURAL HERITAGE, SOILS AND HUMAN BEINGS

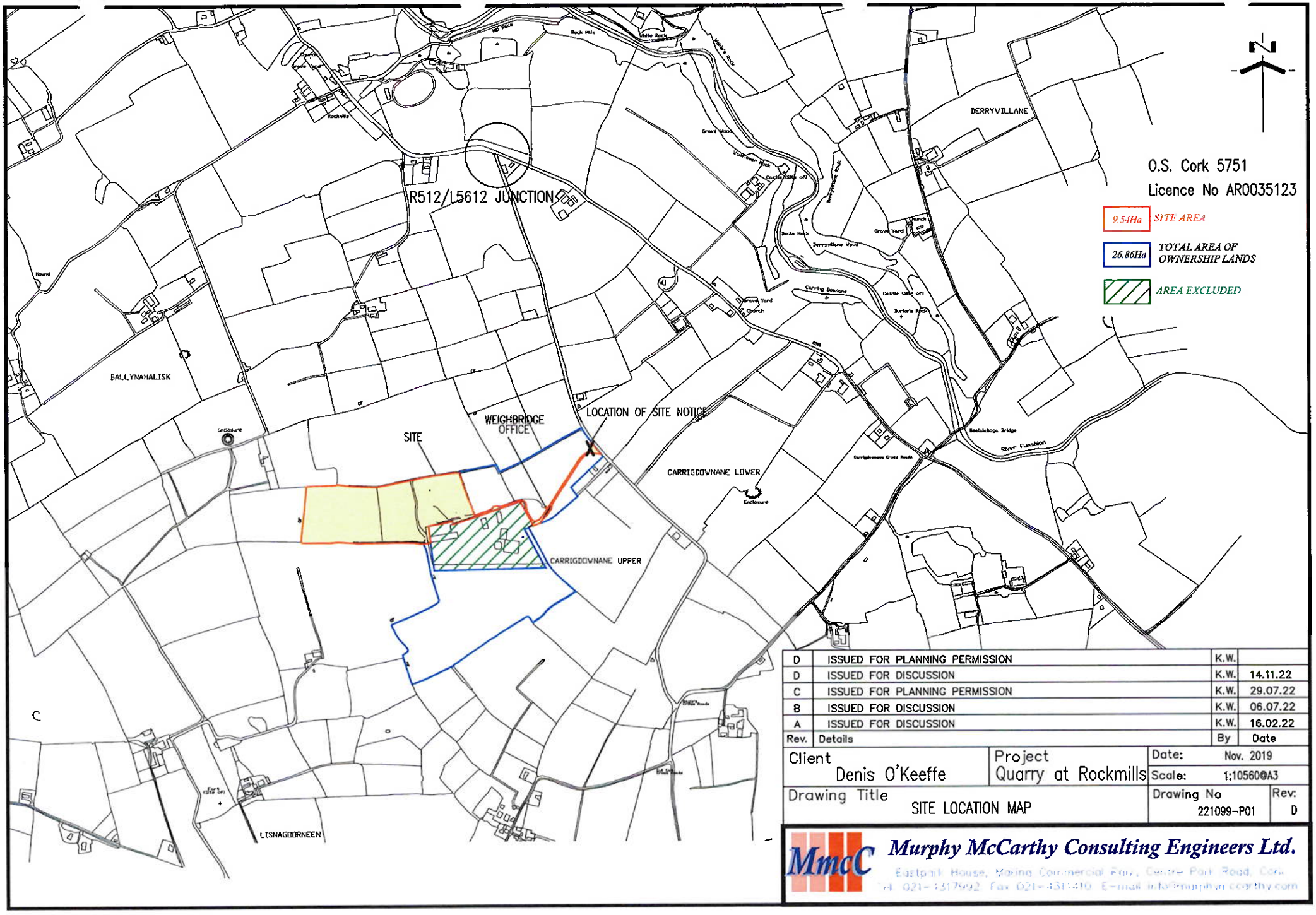
Potential impacts to archaeological, architectural and cultural sites may occur during excavation and soil movements during the construction phase of the development.

There are no known protected archaeological, architectural or cultural heritage sites or features within the proposed development site.

It is not anticipated that the proposed development would have any adverse physical or visual impacts upon the known cultural heritage of the area.

ATTACHMENT 2.0

- DESCRIPTION OF THE DEVELOPMENT -



Rev.	Details	By	Date
D	ISSUED FOR PLANNING PERMISSION	K.W.	
D	ISSUED FOR DISCUSSION	K.W.	14.11.22
C	ISSUED FOR PLANNING PERMISSION	K.W.	29.07.22
B	ISSUED FOR DISCUSSION	K.W.	06.07.22
A	ISSUED FOR DISCUSSION	K.W.	16.02.22

Client: Denis O'Keeffe

Project: Quarry at Rockmills

Date: Nov. 2019

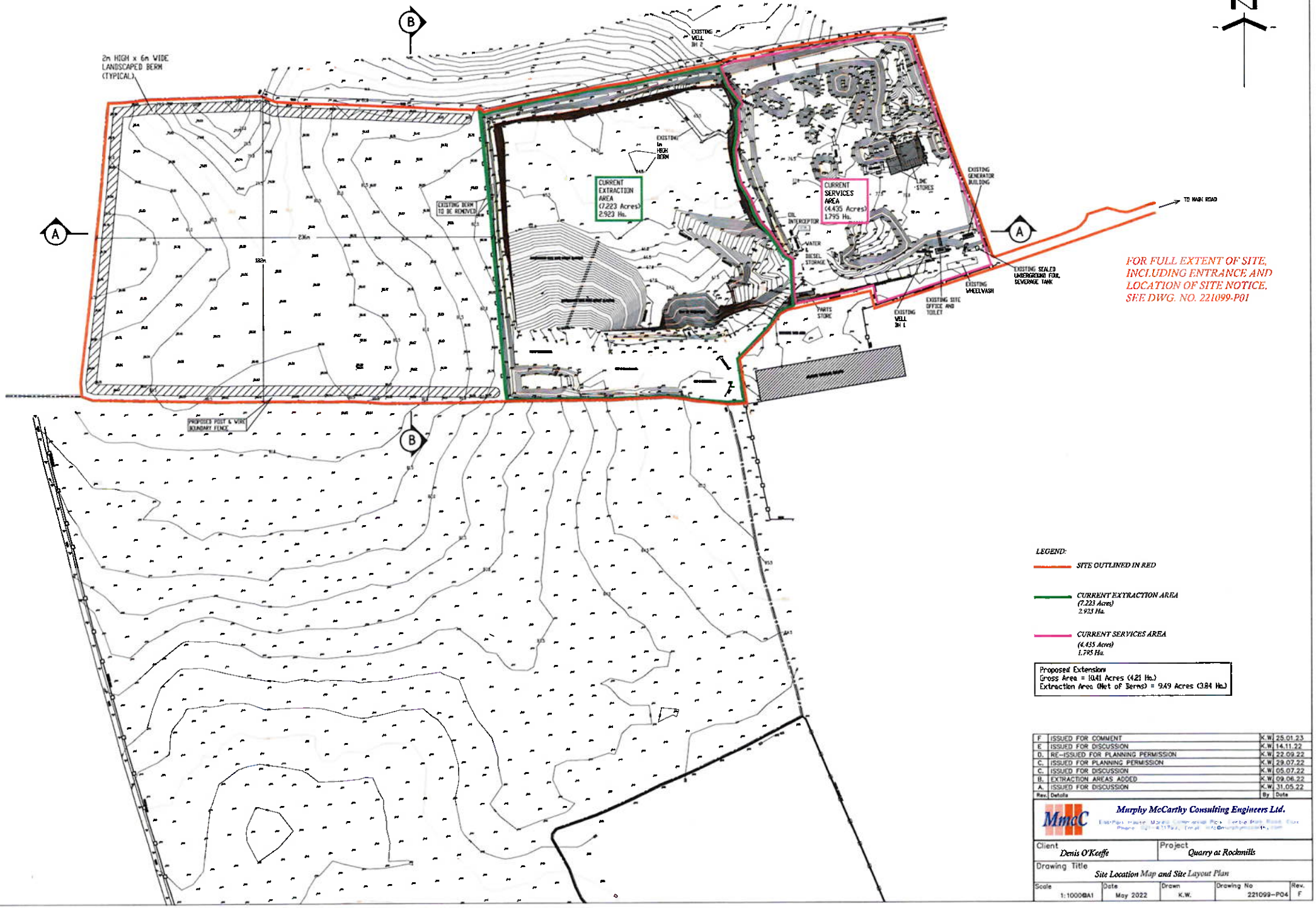
Scale: 1:10560@A3

Drawing Title: SITE LOCATION MAP

Drawing No: 221099-P01

Rev: D

Murphy McCarthy Consulting Engineers Ltd.
Eastpoint House, Mahon Commercial Park, Centre Park Road, Cork
Tel 021-4517992 Fax 021-4311410 E-mail info@murphymccarthy.com



Rev.	Details	By	Date
F.	ISSUED FOR COMMENT	K.W.	25.01.23
E.	ISSUED FOR DISCUSSION	K.W.	14.11.22
D.	RE-ISSUED FOR PLANNING PERMISSION	K.W.	22.09.22
C.	ISSUED FOR PLANNING PERMISSION	K.W.	28.07.22
C.	ISSUED FOR DISCUSSION	K.W.	05.07.22
B.	EXTRACTION AREAS ADDED	K.W.	09.06.22
A.	ISSUED FOR DISCUSSION	K.W.	31.05.22

MmcC
Murphy McCarthy Consulting Engineers Ltd.

Client	Project
Denis O'Keeffe	Quarry at Rockmills

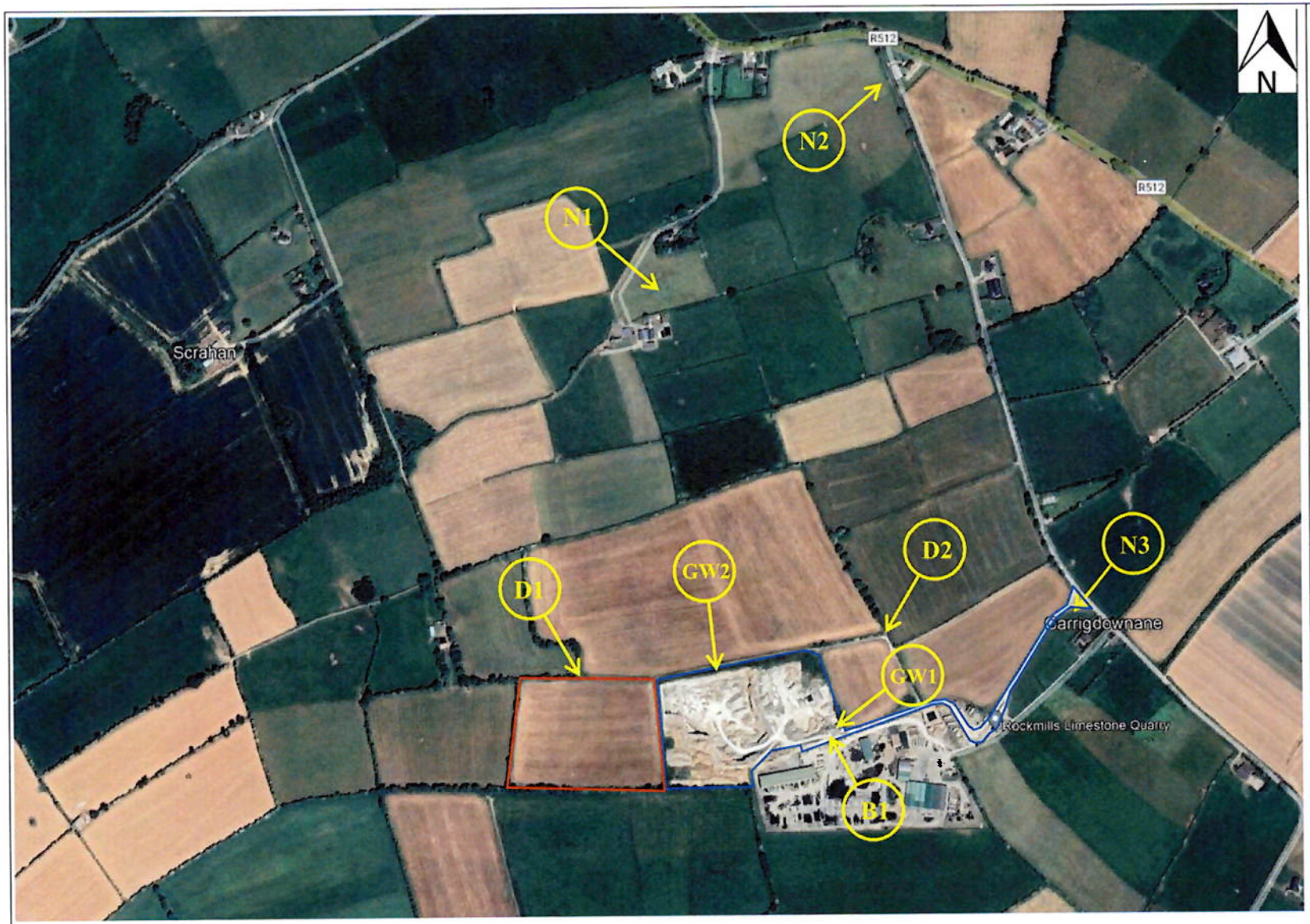
Drawing Title: Site Location Map and Site Layout Plan

Scale	Date	Drawn	Drawing No	Rev.
1:1000@A1	May 2022	K.W.	221099-P04	F

ATTACHMENT 2.3

- PLANNING REFERENCE 15/ 5484 -

- ENVIRONMENTAL MONITORING LOCATIONS -



Notes:

Current Quarry

Proposed Development

Noise Monitoring Locations

N1 – NSR c.555m North

N2 – NSR c.975m North-East

N3 – NSR c.400m East

Dust Locations

D1 – c.115m East

D2 – c.125m West

Blast Locations

B1 – Beside Office

Groundwater Wells

GW1 – Monitoring Well

GW2 – Monitoring Well

DENNIS O'KEEFE, ROCKMILLS QUARRY

CURRENT PLANNING CONDITION MONITORING LOCATIONS

PANTHER
ENVIRONMENTAL SOLUTIONS LTD
UNIT 4
INNOVATION CENTRE
GREEN ROAD
CARLOW
R93 W248
TELEPHONE: 059 91 34222
MOBILE: 087 851 0284
EMAIL: info@pantherwms.com
WEB: www.pantherwms.com

File location:		scale:	NTS (A4)
drawing status:	REPORT	datum:	GOOGLE
		drawn:	PES
drawing no.	rev	checked:	MF
EIAR_21547	A	approved:	-
		date:	29-07-22

ATTACHMENT 5.0

- AIR QUALITY & CLIMATE ATTACHMENTS -

ATTACHMENT 5.1

- DUST MONITORING DATA -

Attachment 5.1.1: 15/5484 Planning Condition Dust Monitoring Data

BHP/AC/F115

TEST REPORT NO: 185814

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	20/09/2336-2337
Quote Ref:	QC004263
Order No:	
Sales Order:	89222
Date Received:	16/09/2020
Date Sampled:	16/09/2020
Date Completed:	18/09/2020
Sample Type:	Environmental Dust
Sampling Period:	19/08/2020 - 16/09/2020

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	801	18/09/2020	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	138	18/09/2020	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 21/09/2020

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

21/09/2020 1

BHP/AC/F115

TEST REPORT NO: 188340

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	20/10/1944-1945
Quote Ref:	QC004263
Order No:	
Sales Order:	92329
Date Received:	14/10/2020
Date Sampled:	14/10/2020
Date Completed:	18/10/2020
Sample Type:	Environmental Dust
Sampling Period:	16/09/2020 - 14/10/2020

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.0057

Testing
Analysing
Consulting

BHP

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	103	18/10/2020	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	139	18/10/2020	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 20/10/2020

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

20/10/2020 1

BHP/AC/F115

TEST REPORT NO: 189868

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	20/11/1793-1794
Quote Ref:	QC004263
Order No:	
Sales Order:	94419
Date Received:	11/11/2020
Date Sampled:	11/11/2020
Date Completed:	17/11/2020
Sample Type:	Environmental Dust
Sampling Period:	14/10/2020 - 11/11/2020

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.0057

Testing
Analysing
Consulting

BHP

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	154	17/11/2020	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	293	17/11/2020	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 23/11/2020

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

23/11/2020 1

BHP/AC/F115

TEST REPORT NO: 191415

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	20/12/1463-1464
Quote Ref:	QC004263
Order No:	
Sales Order:	96569
Date Received:	09/12/2020
Date Sampled:	09/12/2020
Date Completed:	14/12/2020
Sample Type:	Environmental Dust
Sampling Period:	11/11/2020 - 09/12/2020

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	30	14/12/2020	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	103	14/12/2020	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 17/12/2020

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

17/12/2020 1

BHP/AC/F115

TEST REPORT NO: 193406

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/01/0788-0789
Quote Ref:	QC004263
Order No:	
Sales Order:	98912
Date Received:	13/01/2021
Date Sampled:	13/01/2021
Date Completed:	16/01/2021
Sample Type:	Environmental Dust
Sampling Period:	09/12/2020 - 13/01/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	933	16/01/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	133	16/01/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* — **Date Authorised:** 21/01/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

21/01/2021 1

BHP/AC/F115

TEST REPORT NO: 194337

Testing
Analysing
Consulting

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/02/1156-1157
Quote Ref:	QC004263
Order No:	
Sales Order:	100161
Date Received:	10/02/2021
Date Sampled:	10/02/2021
Date Completed:	16/02/2021
Sample Type:	Environmental Dust
Sampling Period:	13/01/2021 - 10/02/2021

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	108	16/02/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	126	16/02/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 18/02/2021

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

18/02/2021 1

BHP/AC/F115

TEST REPORT NO: 195348

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/03/1025-1026
Quote Ref:	QC004263
Order No:	
Sales Order:	101527
Date Received:	10/03/2021
Date Sampled:	10/03/2021
Date Completed:	10/03/2021
Sample Type:	Environmental Dust
Sampling Period:	10/02/2021 - 10/03/2021

Testing
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Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	159	10/03/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	396	10/03/2021	BHP AC 017

Authorised by: Dervla Purcell — Laboratory Manager **Date Authorised:** 15/03/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D2 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

15/03/2021 1

BHP/AC/F115

TEST REPORT NO: 196259

Testing
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Consulting

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No: 21/04/0567-0568
Quote Ref: QC004263
Order No:
Sales Order: 102805
Date Received: 07/04/2021
Date Sampled: 07/04/2021
Date Completed: 12/04/2021
Sample Type: Environmental Dust
Sampling Period: 10/03/2021 - 07/04/2021

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	6	12/04/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	34	12/04/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 19/04/2021

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

19/04/2021 1

BHP/AC/F115

TEST REPORT NO: 197712

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/05/0698-0699
Quote Ref:	QC004263
Order No:	
Sales Order:	104737
Date Received:	05/05/2021
Date Sampled:	05/05/2021
Date Completed:	10/05/2021
Sample Type:	Environmental Dust
Sampling Period:	07/04/2021 - 05/05/2021

Testing
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Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	44	10/05/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	41	10/05/2021	BHP AC 017

Authorised by: Dervla Purcell — Laboratory Manager **Date Authorised:** 13/05/2021

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

13/05/2021 1

BHP/AC/F115

TEST REPORT NO: 200898

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/06/2002-2003
Quote Ref:	QC004263
Order No:	
Sales Order:	108761
Date Received:	11/06/2021
Date Sampled:	11/06/2021
Date Completed:	15/06/2021
Sample Type:	Environmental Dust
Sampling Period:	05/05/2021 - 11/06/2021

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.0057

Testing
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BHP

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	413	15/06/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	596	15/06/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 20/06/2021

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1,D2 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

20/06/2021 1

BHP/AC/F115

TEST REPORT NO: 202324

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/07/1143-1144
Quote Ref:	QC004263
Order No:	
Sales Order:	110791
Date Received:	07/07/2021
Date Sampled:	07/07/2021
Date Completed:	09/07/2021
Sample Type:	Environmental Dust
Sampling Period:	11/06/2021 - 07/07/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	9	09/07/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	14	09/07/2021	BHP AC 017

Authorised by: Dervla Purcell — Laboratory Manager — Date Authorised: 12/07/2021

Additional information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

12/07/2021 1

BHP/AC/F115

TEST REPORT NO: 204318

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/08/1731-1732
Quote Ref:	QC004263
Order No:	
Sales Order:	113603
Date Received:	11/08/2021
Date Sampled:	11/08/2021
Date Completed:	16/08/2021
Sample Type:	Environmental Dust
Sampling Period:	07/07/2021 - 11/08/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO:
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	6	16/08/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	31	16/08/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 19/08/2021

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

19/08/2021 1

BHP/AC/F115

TEST REPORT NO: 205594

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/09/0642-0643
Quote Ref:	QC004263
Order No:	
Sales Order:	115331
Date Received:	02/09/2021
Date Sampled:	02/09/2021
Date Completed:	07/09/2021
Sample Type:	Environmental Dust
Sampling Period:	11/08/2021 - 02/09/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	471	07/09/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	94	07/09/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 08/09/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

08/09/2021 1

BHP/AC/F115

TEST REPORT NO: 208627

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/10/0981-0982
Quote Ref:	QC004263
Order No:	
Sales Order:	119137
Date Received:	06/10/2021
Date Sampled:	06/10/2021
Date Completed:	11/10/2021
Sample Type:	Environmental Dust
Sampling Period:	02/09/2021 - 06/10/2021

Testing
Analysing
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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	81	11/10/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	112	11/10/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 14/10/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

14/10/2021 1

BHP/AC/F115

TEST REPORT NO: 210645

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/11/1954-1955
Quote Ref:	QC005946
Order No:	
Sales Order:	121972
Date Received:	10/11/2021
Date Sampled:	10/11/2021
Date Completed:	13/12/2021
Sample Type:	Environmental Dust
Sampling Period:	06/10/2021 - 10/11/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	13	13/12/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	16	13/12/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 22/11/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

BHP/AC/F115

TEST REPORT NO: 212324

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	21/12/1595-1596
Quote Ref:	QC005946
Order No:	
Sales Order:	124377
Date Received:	08/12/2021
Date Sampled:	08/12/2021
Date Completed:	09/12/2021
Sample Type:	Environmental Dust
Sampling Period:	10/11/2021 - 08/12/2021

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	713	09/12/2021	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	82	09/12/2021	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 14/12/2021

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

14/12/2021 1

BHP/AC/F115

TEST REPORT NO: 213337

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/01/0205-0206
Quote Ref:	QC006037
Order No:	
Sales Order:	125807
Date Received:	05/01/2022
Date Sampled:	05/01/2022
Date Completed:	08/01/2022
Sample Type:	Environmental Dust
Sampling Period:	08/12/2021 - 05/01/2022

Testing
Analysing
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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	407	08/01/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	408	08/01/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 12/01/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D1,D2 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

12/01/2022 1

BHP/AC/F115

TEST REPORT NO: 214783

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/02/0561-0562
Quote Ref:	QC006149
Order No:	
Sales Order:	127870
Date Received:	02/02/2022
Date Sampled:	02/02/2022
Date Completed:	08/02/2022
Sample Type:	Environmental Dust
Sampling Period:	05/01/2022 - 02/02/2022

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Analysing
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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	276	08/02/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	365	08/02/2022	BHP AC 017

Authorised by: Dervla Purcell, *Laboratory Manager* **Date Authorised:** 09/02/2022

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: Sample at location D2 was outside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

09/02/2022 1

BHP/AC/F115

TEST REPORT NO: 216432

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/03/0526-0527
Quote Ref:	QC006149
Order No:	
Sales Order:	130090
Date Received:	02/03/2022
Date Sampled:	02/03/2022
Date Completed:	05/03/2022
Sample Type:	Environmental Dust
Sampling Period:	02/02/2022 - 02/03/2022

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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	84	05/03/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	181	05/03/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 11/03/2022

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

11/03/2022 1

BHP/AC/F115

TEST REPORT NO: 219265

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No: 22/04/0644-0645
Quote Ref: QC006149
Order No:
Sales Order: 133690
Date Received: 04/04/2022
Date Sampled: 04/04/2022
Date Completed: 07/04/2022
Sample Type: Environmental Dust
Sampling Period: 02/03/2022 - 04/04/2022

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: derviapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	117	07/04/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	109	07/04/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 13/04/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

BHP/AC/F115

TEST REPORT NO: 221081

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/05/0585-0586
Quote Ref:	QC006149
Order No:	
Sales Order:	136025
Date Received:	04/05/2022
Date Sampled:	04/05/2022
Date Completed:	09/05/2022
Sample Type:	Environmental Dust
Sampling Period:	04/04/2022 - 04/05/2022

Testing
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Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	119	09/05/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	137	09/05/2022	BHP AC 017

Authorised by: Dervla Purcell, *Laboratory Manager* **Date Authorised:** 11/05/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: iNAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

11/05/2022 1

BHP/AC/F115

TEST REPORT NO: 233125

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/09/1478-1479
Quote Ref:	QC006149
Order No:	
Sales Order:	150511
Date Received:	07/09/2022
Date Sampled:	07/09/2022
Date Completed:	12/09/2022
Sample Type:	Environmental Dust
Sampling Period:	03/08/2022 - 07/09/2022

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	116	12/09/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	134	12/09/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 14/09/2022

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

14/09/2022 1

BHP/AC/F115

TEST REPORT NO: 237600

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/11/0432-0433
Quote Ref:	QC006149
Order No:	
Sales Order:	156151
Date Received:	02/11/2022
Date Sampled:	02/11/2022
Date Completed:	04/11/2022
Sample Type:	Environmental Dust
Sampling Period:	05/10/2022 - 02/11/2022

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	247	04/11/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	117	04/11/2022	BHP AC 017

Authorised by: Dervla Purcell, Laboratory Manager — Date Authorised: 10/11/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

1

BHP/AC/F115

TEST REPORT NO: 245750

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	**23/01/0167-0168**
Quote Ref:	**QC006149**
Order No:	
Sales Order:	**165338**
Date Received:	**04/01/2023**
Date Sampled:	**04/01/2023**
Date Completed:	**05/01/2023**
Sample Type:	**Environmental Dust**
Sampling Period:	**07/12/2022 - 04/01/2023**

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	270	05/01/2023	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	350	05/01/2023	BHP AC 017

Authorised by: Dervla Purcell, *Laboratory Manager* **Date Authorised:** 09/01/2023

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

BHP/AC/F115

TEST REPORT NO: 250357

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No: 23/03/0388-0389
Quote Ref: QC006149
Order No:
Sales Order: 171008
Date Received: 01/03/2023
Date Sampled: 01/03/2023
Date Completed: 02/03/2023
Sample Type: Environmental Dust
Sampling Period: 01/02/2023 - 01/03/2023

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	76	01/03/2023	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	111	02/03/2023	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 06/03/2023

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

Attachment 5.1.2: EIAR Baseline Dust Monitoring Data

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1061

T.E. LABORATORIES LIMITED
Trading as
TelLab

Loughmartin Business Park, Tullow, Co. Carlow
Phone: 059-9152881 Fax: 059-9152886

CERTIFICATE OF ANALYSIS

Page 1 of 2

Project Description:	Analysis of Dust Samples		
Attention:	Ms. Liz Nolan	**Lab ID:**	26909 -26911
Company:	Panther Environmental Solution Ltd		
Address:	Unit 3&4 Innovation Centre, Institute of Technology, Green Road, Carlow	**Date Sampled:**	12/05/2022
Certificate No:	L/22/1245	**Date Rec'd:**	15/06/2022
Issue Date:	04/07/2022	**Our Ref:**	18503

Project Summary:	Three samples were analysed for a range of determinands. Please see page 2 for results. Terms & Conditions and methods used are outlined in the attached appendix.
No. of Pages:	Results page 2 plus 4 page appendix

Kasia Gosek
Technical Team Lead

Ms Breda Moore
Technical Manager

TelLab

ANALYSIS OF DUST DEPOSITION GAUGES

Date Sampled: 12/05/2022 - 10/06/2022
Date Received: 15/06/2022
Date Analysis Commenced: 29/06/2022
Our Ref: 18503
Your Ref: Rockmills Quarry
Certificate No: L/22/1245

Sample ID	Lab ID	Dustfall (mg/m^{2}d)* (**)	Dustfall (g/m^{2}d)* (**)
Site 1	26909	82	0.082
Site 2 #	26910	91	0.091
Site 3	26911	59	0.059

*Note: d = sampling period in days (29 days)
m = collecting surface area (metre)
g = mass of dustfall (gram)
mg = mass of dustfall (milligram)

** = INAB Accredited Tests ++ = Subcontracted Tests n/a = Non-INAB Accredited Tests

The above results relate only to the sample tested
This report should not be regenerated except in full and with the consent of T.E. Laboratories Ltd.

BHP/AC/F115

TEST REPORT NO: 233125

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No: 22/09/1478-1479
Quote Ref: QC006149
Order No:
Sales Order: 150511
Date Received: 07/09/2022
Date Sampled: 07/09/2022
Date Completed: 12/09/2022
Sample Type: Environmental Dust
Sampling Period: 03/08/2022 - 07/09/2022

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	116	12/09/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	134	12/09/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 14/09/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

14/09/2022 1

BHP/AC/F115

TEST REPORT NO: 237600

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	22/11/0432-0433
Quote Ref:	QC006149
Order No:	
Sales Order:	156151
Date Received:	02/11/2022
Date Sampled:	02/11/2022
Date Completed:	04/11/2022
Sample Type:	Environmental Dust
Sampling Period:	05/10/2022 - 02/11/2022

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	247	04/11/2022	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	117	04/11/2022	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 10/11/2022

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

BHP/AC/F115

TEST REPORT NO: 245750

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	23/01/0167-0168
Quote Ref:	QC006149
Order No:	
Sales Order:	165338
Date Received:	04/01/2023
Date Sampled:	04/01/2023
Date Completed:	05/01/2023
Sample Type:	Environmental Dust
Sampling Period:	07/12/2022 - 04/01/2023

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	270	05/01/2023	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	350	05/01/2023	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 09/01/2023

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

1

BHP/AC/F115

TEST REPORT NO: 250357

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No:	23/03/0388-0389
Quote Ref:	QC006149
Order No:	
Sales Order:	171008
Date Received:	01/03/2023
Date Sampled:	01/03/2023
Date Completed:	02/03/2023
Sample Type:	Environmental Dust
Sampling Period:	01/02/2023 - 01/03/2023

Testing
Analysing
Consulting

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	76	01/03/2023	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	111	02/03/2023	BHP AC 017

Authorised by: Dervla Purcell — Laboratory Manager — **Date Authorised:** 06/03/2023

Additional Information:(Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

1

BHP/AC/F115v2

TEST REPORT NO: 252711

Testing
Analysing
Consulting

Client: Rockmills Quarries T/A Tom Lynes Plant Hire

Cecilstown
Mallow
Co. Cork

BHP Ref. No: 23/04/0909-0911
Quote Ref: QC007460
Order No:
Sales Order: 174113
Date Received: 05/04/2023
Date Sampled: 05/04/2023
Date Completed: 07/04/2023
Sample Type: Environmental Dust
Sampling Period: 01/03/2023 - 05/04/2023

BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Fax: +353 61 455261
EMail: dervlapurcell@bhp.ie

FTAO: Tom Lynes
Site: Rockmills Quarry
BHP Ref: Monthly_Environmental Dust

TestName		ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition	Acc	D1	mg/m²/day	80	07/04/2023	BHP AC 017
Dust Deposition	Acc	D2	mg/m²/day	82	07/04/2023	BHP AC 017
Dust Deposition	Acc	D3	mg/m²/day	80	07/04/2023	BHP AC 017

Authorised by: Dervla Purcell — *Laboratory Manager* **Date Authorised:** 16/04/2023

Additional Information: (Opinions, where stated, are not covered by accreditation)
Acc.: INAB Accredited
Notes: All sample locations were inside the EPA limit of 350 mg/m2/day.
Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.
Sample Conditions: All samples in acceptable condition.

1

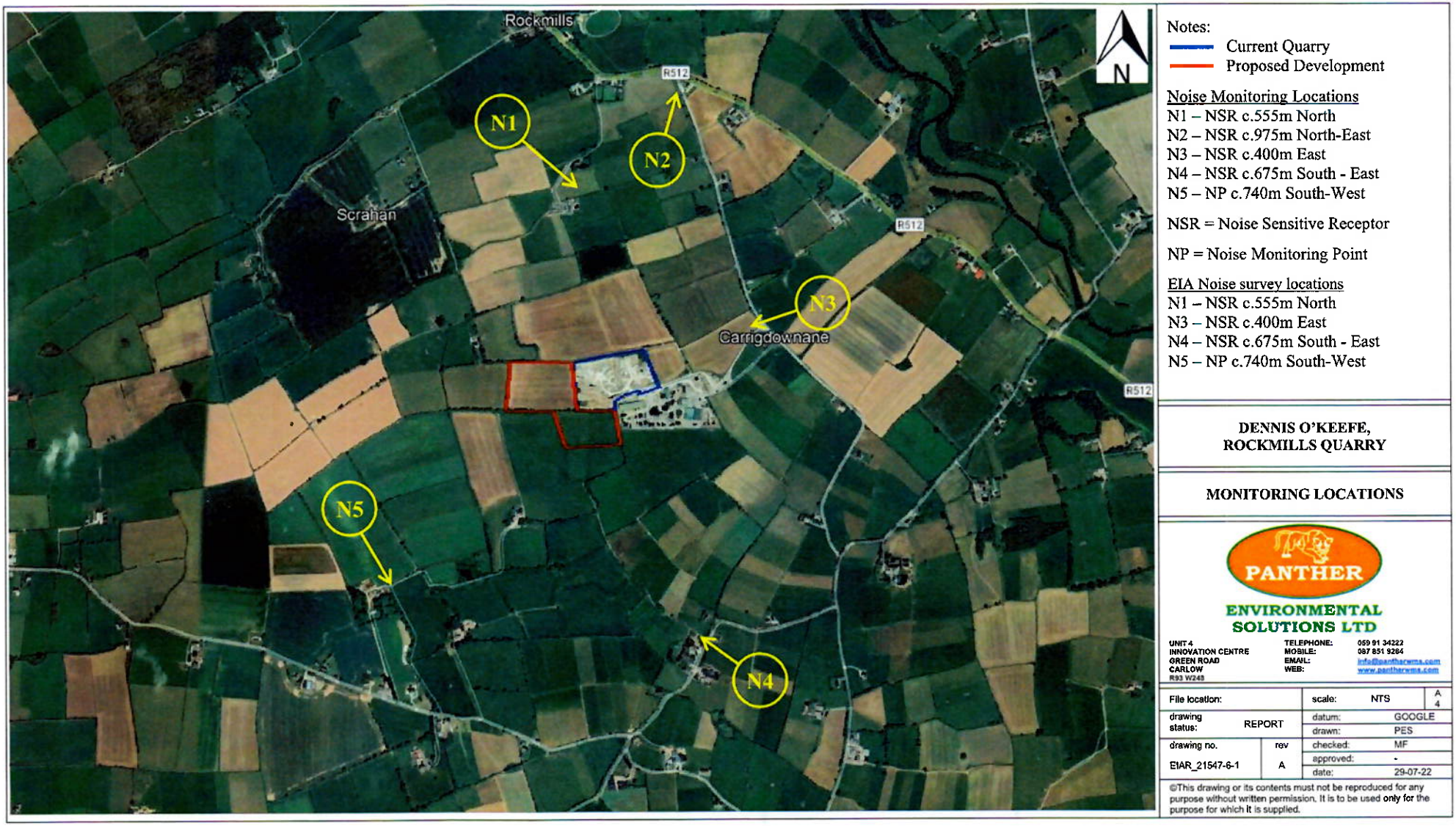
ATTACHMENT 6.0

- NOISE & VIBRATION ATTACHMENTS -

ATTACHMENT 6.1

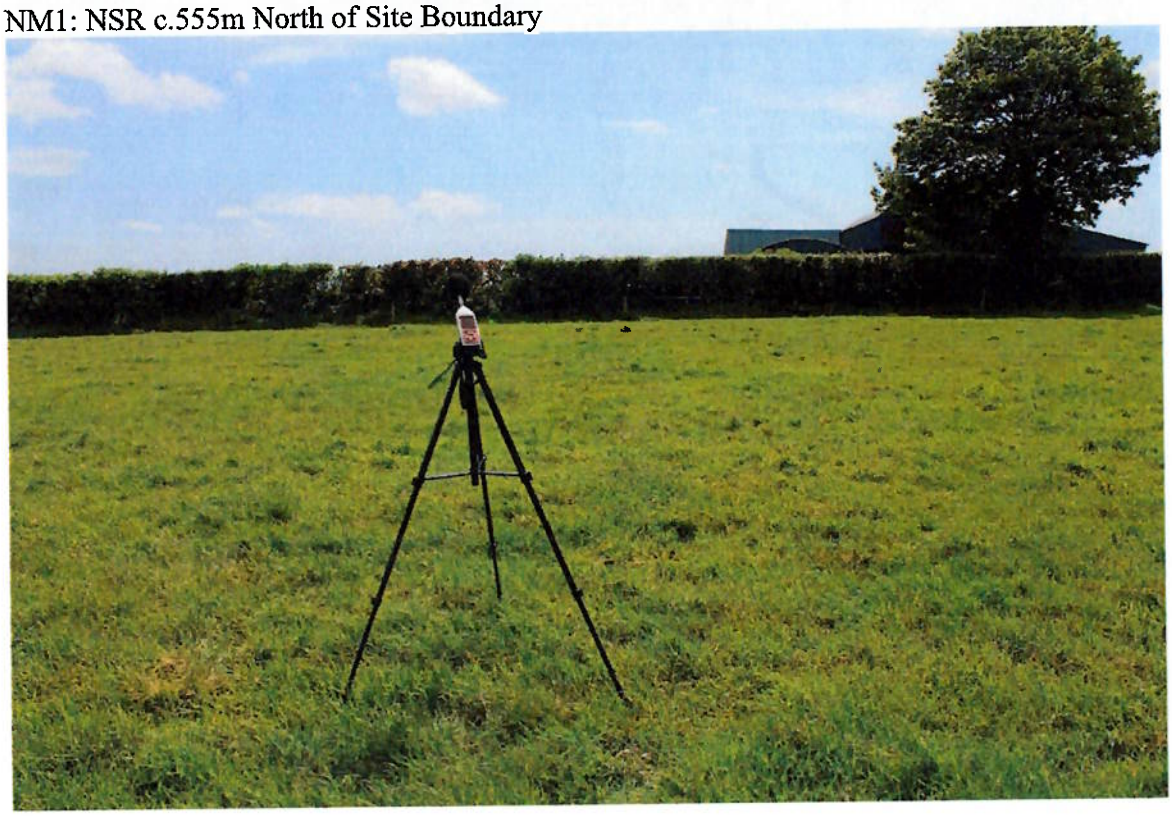
- NOISE MONITORING INFORMATION -

Attachment 6.1.1: Noise Monitoring Locations

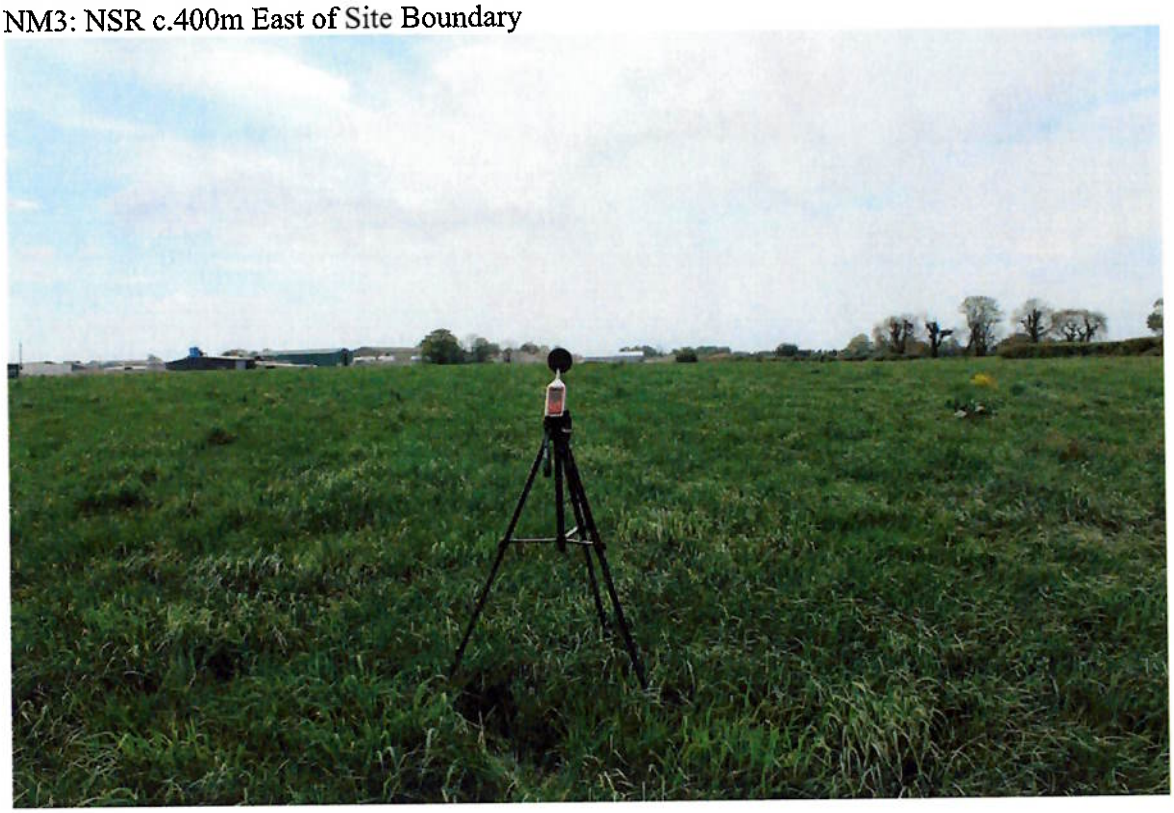


Attachment 6.1.2: EIA Noise Survey Location Photographs

NM1: NSR c.555m North of Site Boundary

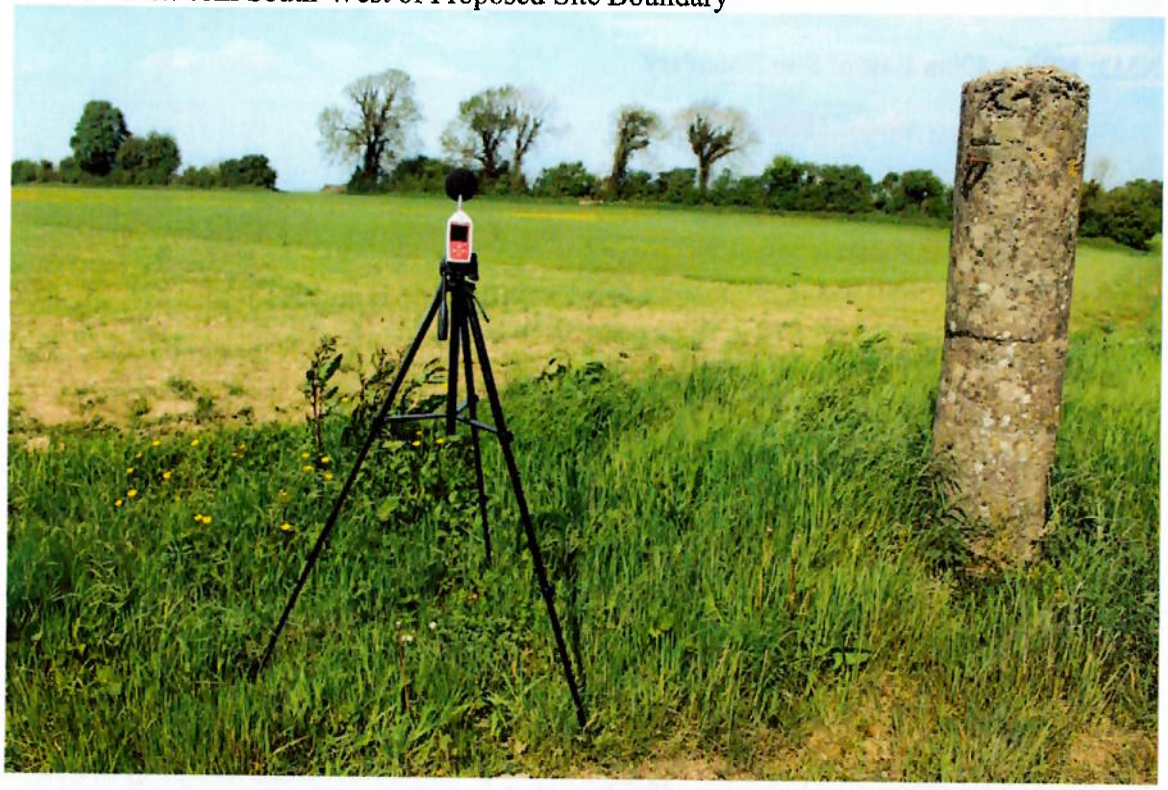


NM3: NSR c.400m East of Site Boundary



NM4: NSR c.675m South-East of Proposed Site Boundary

NM5 : NP c.740m South-West of Proposed Site Boundary



Attachment 6.1.3: Noise Meter Calibration Certs

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **30 July 2021** CERTIFICATE NUMBER **160751**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
T.Goodrich
Electronically signed:

T. A. Goodrich.

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G071199	
Class:	1	
Firmware version:	3.2.3197	

Test summary

Date of calibration: 29 July 2021

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 17 August 2021 CERTIFICATE NUMBER 161564

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R.Woodall
Electronically signed:

R Woodall

Sound Level Meter : IEC 61672-3:2006

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:831C	
Serial number:	D21509FF	
Class:	1	
Firmware version:	04.00	

Test summary

Date of calibration: 17 August 2021

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2006.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Notes

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **30/07/21** CERTIFICATE NUMBER **160750**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Test engineer:
D.Swalwell
Electronically signed:

Microphone

Microphone capsule

Manufacturer: Cirrus Research plc

Model: MK:224

Serial Number: 203537A

Calibration procedure

Date of calibration: 29 July 2021

Open circuit: 52.7 mV/Pa

Sensitivity at 1 kHz: -25.6 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 99.40 kPa

Temperature: 21.0 °C

Humidity: 52.0 %

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **30 July 2021** CERTIFICATE NUMBER **160749**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
T.Goodrich
Electronically signed:

T. A. Goodrich.

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer:	Cirrus Research plc	**Notes:**
Model:	CR:515	
Serial number:	54060	
Class:	1	

Test summary

Date of calibration: 30 July 2021

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed with the PhysikalischTechnische Bundesanstalt (PTB), Laboratoire National d'Essais (LNE) and APPLUS.

Notes:

ATTACHMENT 6.2

- HISTORIC NOISE & VIBRATION DATA -

Attachment 6.2.1: Historic Noise Monitoring Data

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills , Co. Cork.
22 January 2021.
Weather Conditions; Cloudy, Dry, Wind 0-1m/s SW, 9° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	14:33-15:03	30 mins	48	50	41	No	Quarry activity heard from this location. Plant machinery heard moving around the site with reversing sirens at 35-44dBA. Traffic passing occasionally on local road was at 46-50dBA. Noise from Cossmore Transport Ltd heard at 40dBA
N 2	14:38-15:08	30 mins	46	48	33	No	Quarry activity is faintly audible from this location at 30-38dbBA. Traffic passing occasionally on local road reached 46-52dBA rising to 63dbBA when trucks passed.
N 3	15:16-15:46	30 mins	39	40	31	No	Quarry activity was faintly audible from this location at 30-35dBA. Occasional distant traffic heard at 33dBA.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills , Co. Cork.
20 April 2021.
Weather Conditions; Cloudy, Dry, Wind 0-1m/s NNE, 10° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	13:14-13:44	30 mins	46	48	38	No	Quarry activity heard from this location. Plant machinery heard moving around the site with reversing sirens at 33-42dBA. Trucks entering and exiting the site heard at 55-63dBA. Traffic passing occasionally on local road was at 48-55dBA. Noise from Cossmore Transport Ltd heard at 30-40dBA
N 2	13:19-13:49	30 mins	41	43	32	No	Quarry activity is faintly audible from this location at 30-35dBA. Traffic passing occasionally on local road reached 46-52dBA rising to 62dBA when trucks passed.
N 3	13:51-14:21	30 mins	34	36	27	No	Quarry activity was faintly audible from this location at 33-38dBA. Occasional distant traffic heard at 28-33dBA.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills , Co. Cork.
17 August 2021.
Weather Conditions; Cloudy, Dry, Wind 0-1m/s NNE, 18° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	13:14-13:44	30 mins	47	49	38	No	Quarry activity heard from this location. Plant machinery heard moving around the site with reversing sirens at 33-42dBA. Trucks entering and exiting the site heard at 55-65dba. Traffic passing occasionally on local road was at 48-55dBA. Noise from Cossmore Transport Ltd heard at 30-40dBA
N 2	13:19-13:49	30 mins	49	49	37	No	Quarry activity is faintly audible from this location at 30-35dBA. Traffic passing occasionally on local road reached 46-52dBA rising to 62dBA when trucks passed.
N 3	13:51-14:21	30 mins	40	43	34	No	Quarry activity was faintly audible from this location at 33-38dBA. Occasional distant traffic heard at 28-33dBA. Geese heard occasionally in nearby property at 38-42dBA.

Daytime Measurements- Noise Location- Rockmills Quarry,
Rockmills, Co. Cork.
30 November 2021.
Weather Conditions; Cloudy, Dry, Wind 3m/s W, 11°C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	11:10-11:40	30 mins	52	54	46	No	The quarry crusher and mobile plant with reversing sirens operating on site are audible at 45-55 dBA with occasional rockfall/rock scraping sounds at up to 60 dBA. Trucks on quarry road at 50-60 dBA. Some passing traffic on public road at 50-60 dBA
N 2	11:14-11:44	30 mins	49	52	38	No	Occasional rockfall and reversing sirens sounds audible from the quarry at 40-45 dBA. Traffic noise from R512 at 50-60 dBA at times, traffic passing by on local road paused out.
N 3	11:53-12:23	30 mins	40	42	32	No	Activity audible from the quarry at at 35-40 dBA with some rockfall sounds at up to 45 dBA. Some wind noise at 40-45 dBA.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills , Co. Cork.
31 January 2022.
Weather Conditions; Cloudy, Wet, Wind 1-2m/s W, 7° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	11:47-12:17	30 mins	53	53	46	No	Quarry activity audible from this location. Trucks entering and exiting the site heard at 55-65dBA. Occasional reversing sirens heard at 40-45dBA.Traffic passing on local road audible occasionally at 45-52dBA. Occasional noise from Cossmore Ltd audible during lulls in traffic noise at 30-38dBA.
N 2	11:50-12:20	30 mins	45	47	37	No	Quarry activity is faintly audible from this location at 30-38dBA. Traffic passing occasionally on local road reached 45-55dBA and occasional trucks passing the monitoring location reached 65dBA.
N 3	11:53-12:23	30 mins	42	43	36	No	Quarry activity was faintly audible from this location. Plant machinery audible at 30-40dBA. Dog in property adjacent to monitoring location barking occasionally at 40-48dBA.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills , Co. Cork.
13 May 2022.
Weather Conditions; Cloudy, Dry, Wind 6-7m/s SW, 12° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	11:19-11:49	30 mins	55	59	44	No	Quarry activity audible from this location. Trucks entering and exiting the site heard at 55-65dBA. Traffic passing on local road audible occasionally at 45-55dBA.
N 2	11:24-11:54	30 mins	54	51	41	No	Quarry activity is faintly audible from this location at 30-38dBA. Traffic passing occasionally on local road reached 45-55dBA and occasional trucks passing the monitoring location reached 65dBA. This was the main noise source.
N 3	12:01-12:31	30 mins	43	46	37	No	Quarry activity was faintly audible from this location. Plant machinery audible at 30-40dBA.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills, Co. Cork.
20 July 2022.
Weather Conditions; Mostly Cloudy, Dry, Wind 4-5m/s NE, 19° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	11:58-12:28	30 mins	51	53	43	No	Quarry activity audible from this location. Trucks entering and exiting the site heard at 55-60dBA. Traffic passing on local road audible occasionally at 45-55dBA. Mobile plant audible at approx. 45dBA.
N 2	12:32-13:02	30 mins	53	54	38	No	Quarry activity is faintly audible from this location at 30-38dBA. Traffic passing occasionally on local road reached 45-55dBA and occasional trucks passing the monitoring location reached 65-70dBA. This was the main noise source.
N 3	13:09-13:39	30 mins	41	44	36	No	Quarry activity was not audible from this location.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills, Co. Cork.
10 November 2022.
Weather Conditions; Mostly Cloudy, Wet, Wind 11-12 m/s S, 13° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	12:46-13:16	30 mins	55	59	46	No	No trucks entered or exited the site during testing. Traffic passing on local road audible occasionally at 45-55dBA. Wind noise heard consistently through testing at 50-60dBA. This was the main source of the noise.
N 2	13:20-13:50	30 mins	59	64	54	No	Quarry activity not audible from this location. Traffic passing occasionally on local road reached 45-55dBA and occasional trucks passing the monitoring location reached 65-70dBA. Wind related noise was heard frequently through testing at 50-60dBA.
N 3	14:02-14:32	30 mins	50	51	41	No	Quarry activity was not audible from this location. Wind noise was heard consistently through testing at 45-55dBA. This was the main source of the noise.

Daytime Measurements- Noise Locations- Rockmills Quarry
Rockmills, Co. Cork.
19 April 2023
Weather Conditions; Partly Cloudy, Dry, Wind 3-4 m/s E, 12° C.

Location	Sampling Period	Duration	LAeqt dB	LA10 dB	LA90 dB	Impulsive/ Tonal	Notes
N 1	13:28-13:58	30 mins	48	46	32	No	Traffic passing on local road audible occasionally at 45-55dBA. Occasional truck entering/exiting the site. No noise audible from inside the site. Wind noise heard consistently through testing at 35-45dBA. This was the main source of the noise.
N 2	13:25-13:55	30 mins	61	54	36	No	Quarry activity not audible from this location. Wind related noise was heard occasionally through testing at 40-50dBA. Traffic passing occasionally on local road reached 55-75dBA and occasional tractors passing the monitoring location reached 65-80dBA.
N 3	14:06-14:36	30 mins	42	41	32	No	Quarry activity was audible from this location. Faint revering sirens and mobile plant audible consistently through testing at 30-35dBA. Passing car in driveway during testing. Distant traffic heard occasionally at 35-45dBA.

Attachment 6.2.2: Historic Blast Vibration & Noise Monitoring Data

Blast 06/07/2020 - Event 1

Version 4.2.4
Executable Date: 18Oct2017

File: c:\SuperGraphics.TMP\tmp\18.NSZ

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Nomis Seismographs, Inc.

Company: TOM LYNES

Unit #: 4086

06/07/2020 at 16:11:35 Event # 18

Location: ROCKMILLS

Operator: JC

Notes: bearing 254

Distance: 340 m *Wgt. Per Delay: N* *Scaled Distance: 0.0*

Record Duration: 7.0 sec
Sample Rate: 2048/sec
Last Calibration: 19Dec19

Seismic

Gain: 2 Trigger: .508 mm/s ▽ Vector Sum: 1.2 mm/s @ 6.24 Hz

Channel	Radial	Transverse	Vertical
Velocity (mm/s)	1.016	0.508	0.445
Frequency (Hz)	6.20	39.30	17.60
Trigger >>> Peak	5.4	6.3	10.3

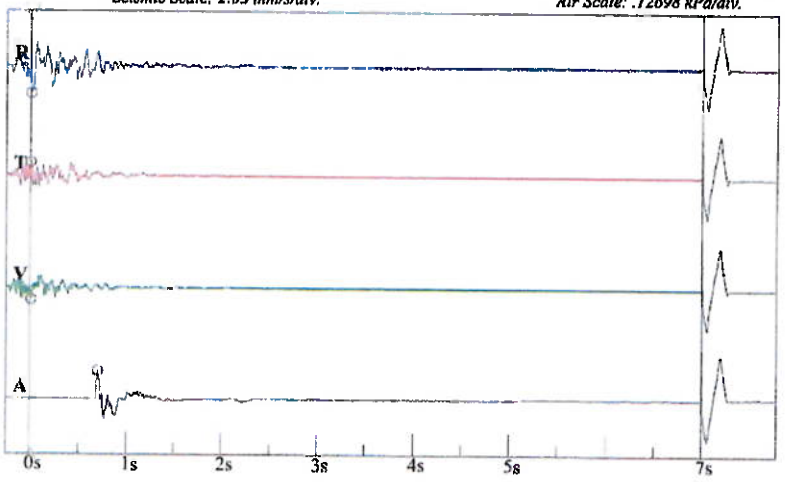
Air

Gain: 1 Air Trigger: 120 dBL

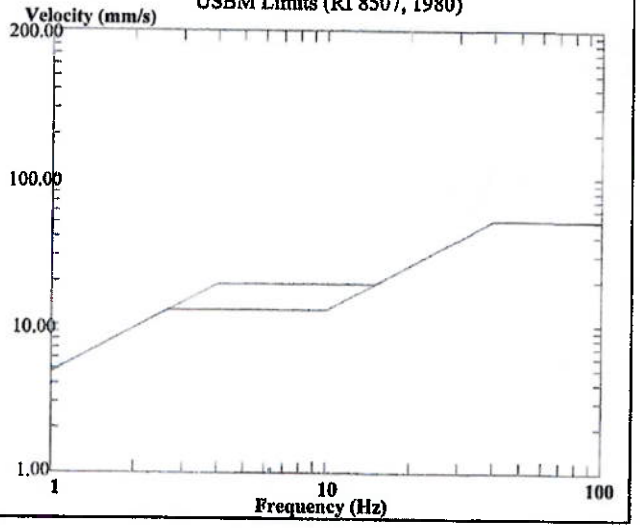
Measurement	Value	Trigger >>> Peak	
		701.2	
kPa	.065		
dBL	130.2		
Hz	4.6		

Waveform Analysis / Frequency Plot

Seismic Scale: 2.03 mm/s/div. *Air Scale: .12698 kPa/div.*



USBM Limits (RI 8507, 1980)



Blast 06/07/2020 - Event 2

., 2.0.1.9 (13Apr2020(q))

File: tom lynes passageway.ns8

Nomis Seismographs

Telephone: 205-592-2488

Nomis Seismographs, Inc.

Company: TOM LYNES

Unit #: 21050

06/07/2020 at 16:09 Event # 81

Location: PASSAGEWAY 2

Operator: JC

Notes: Distance from monitor to blast 52mtrs. Bearing 120 degrees

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 09/12/2019

Distance: N Wgt. Per Delay: N Scaled Distance: N

GPS Coordinates: 52 12.39.846, -08 24.41.262@ UTC: 2020/07/06 15:03:32

Seismic

Gain: 2 Trigger: 0.508mm/s Vector Sum: 135.8 mm/s @ 11.13 Hz

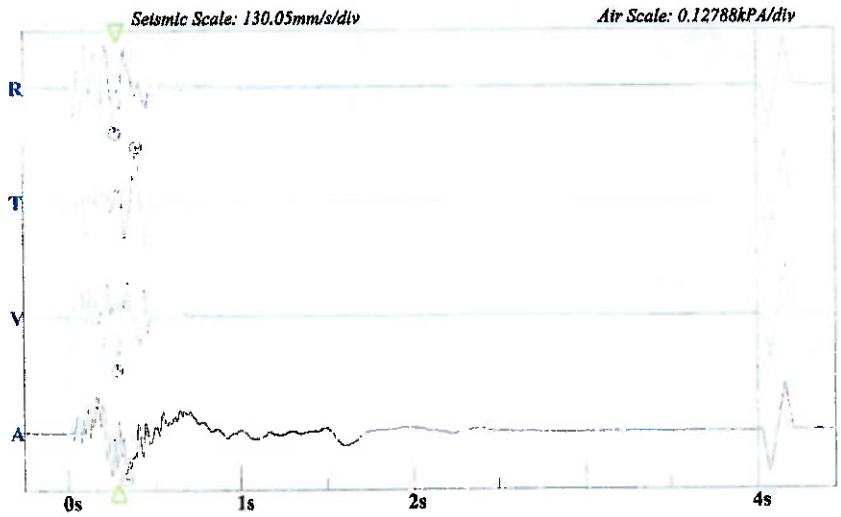
Channel	Radial	Transverse	Vertical
Velocity (mm/s)	103.4137	125.6863	120.5627
Frequency (Hz)	7.3	8.8	11.1
Displacement (mm)	2.2546	2.2731	1.7287
Acceleration (g's)	0.483	0.708	0.857
Trigger >>> Peak	278.3	399.4	288.1

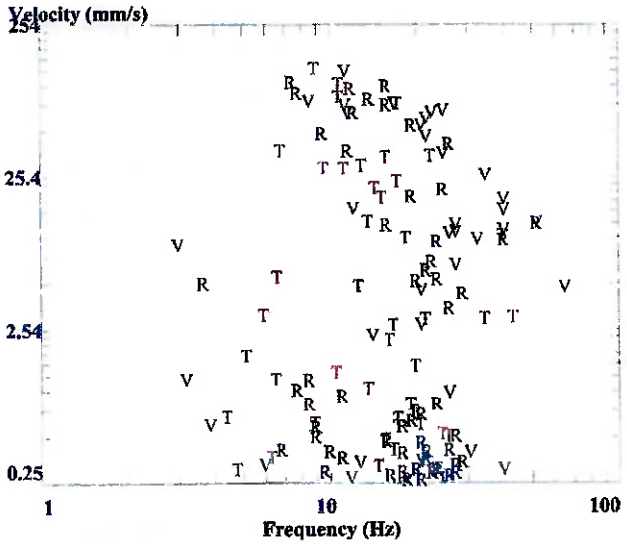
Air

Gain: 1 Air Trigger: N

Measurement	Value	Trigger >>> Peak
		336.9
kPA	0.101067	
dBL	134.1	
Hz	4.8	

Waveform Analysis / Frequency Plot





Blast 06/07/2020 - Event 3

.. 2.0.1.9 (13Apr2020(q))

File: Tom lynes canteen.ns8

(Nomis Seismographs (

Telephone: 205-592-2488

Nomis Seismographs, Inc.

Company: TOM LYNES

Unit #: 21051

06/07/2020 at 16:09 Event # 33

Location: CANTEEN

Operator: JC

Notes: Distance from canteen to blast 247mtrs. Bearing 284 degrees

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 09/12/2019

Distance: N *Wgt. Per Delay: N* *Scaled Distance: N*

GPS Coordinates: 52 12.38.19, -08 24.24.636@ UTC: 2020/07/06 14:44:17

Seismic

Gain: 2 Trigger: 0.508mm/s Vector Sum: 4.8 mm/s @ 10.24 Hz

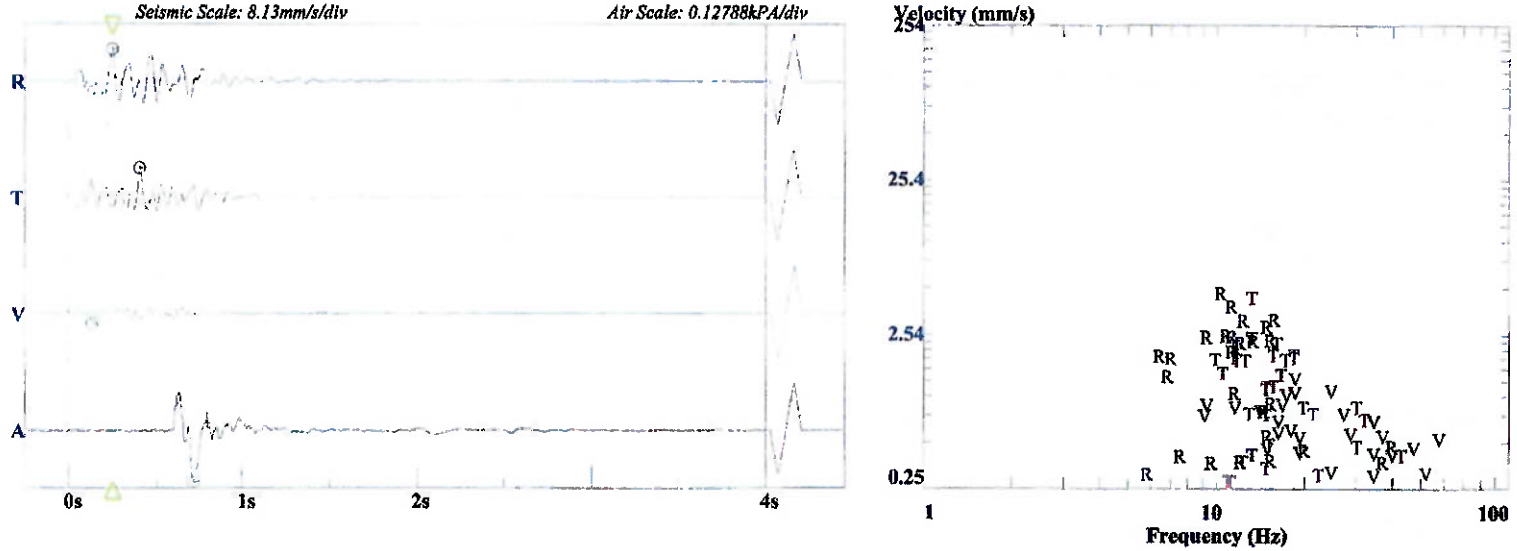
Channel	Radial	Transverse	Vertical
Velocity (mm/s)	4.6037	4.2426	1.2541
Frequency (Hz)	10.2	13.1	18.2
Displacement (mm)	0.0718	0.0515	0.0110
Acceleration (g's)	0.030	0.036	0.015
Trigger >>> Peak	249.0	405.3	130.9

Air

Gain: 1 Air Trigger: N

Measurement	Value	Trigger >>> Peak
		713.9
kPA	0.111454	
dBL	134.9	
Hz	6.8	

Waveform Analysis / Frequency Plot



Blast 06/07/2020 - Event 3

File: Rockmills canteen.ns8

Version 2.0 1.9 (13Apr2020(q))

Nomis Seismographs

Telephone: 205-592-2488

Nomis Seismographs, Inc.

Company: Rockmills

Unit #: 21050

02/09/2020 at 15:24 Event # 95

Location: Canteen

Operator: JC

Notes: Distance from blast to canteen 157mtrs. Bearing 123 degrees

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 09/12/2019

Distance: N	Wgt. Per Delay: N	Scaled Distance: N

GPS Coordinates: 52 12.37.836, -08 24.26.262@; UTC: 2020/09/02 14:19:31

Seismic

Gain: 2 Trigger: 0.508mm/s Vector Sum: 23.82 mm/s @ 11.38 Hz

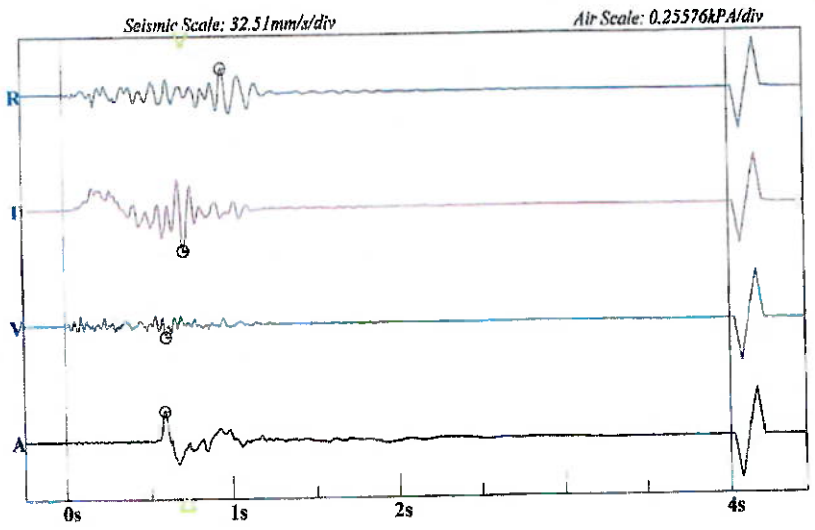
Channel	Radial	Transverse	Vertical
Velocity (mm/s)	14.1605	23.8165	5.965
Frequency (Hz)	12.8	11.3	9.3
Displacement (mm)	0.1761	0.3354	0.1021
Acceleration (g's)	0.116	0.172	0.036
Trigger >>> Peak	952.1	712.9	601.6

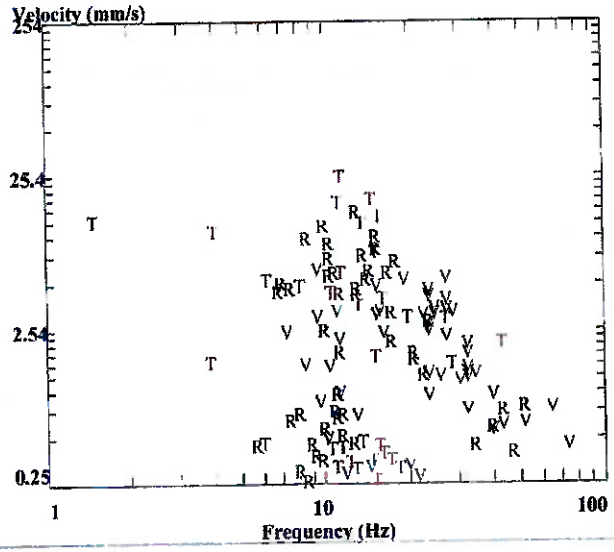
Air

Gain: 1 Air Trigger: N

Measurement	Value	Trigger >>> Peak
		588.9
kPA	0.135085	
dBL	136.6	
Hz	5.3	

Waveform Analysis / Frequency Plot





Attachment 6.2

Blast 02/09/2020

File: Rockmills canteen.ns8

Version 2.0.1.9 (13Apr2020(q))

Nomis Seismographs
Telephone: 205-592-2488

Nomis Seismographs, Inc.

Company: Rockmills

Unit #: 21050

02/09/2020 at 15:24 Event # 95

Location: Canteen

Operator: JC

Notes: Distance from blast to canteen 157mtrs. Bearing 123 degrees

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 09/12/2019

Distance: N	Wgt. Per Delay: N	Scaled Distance: N

GPS Coordinates: 52 12.37.836, -08 24.26.262@ UTC: 2020/09/02 14:19:31

Seismic

Gain: 2 Trigger: 0.508mm/s Vector Sum: 23.82 mm/s @ 11.38 Hz

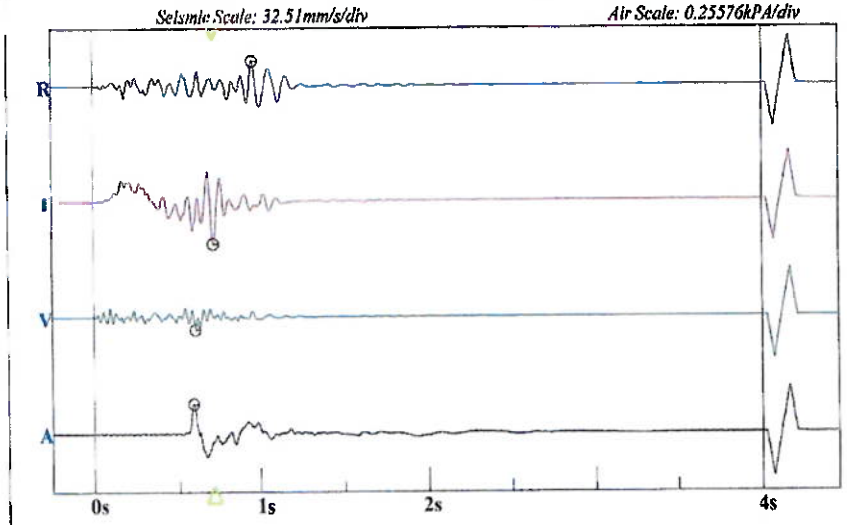
Channel	Radial	Transverse	Vertical
Velocity (mm/s)	14.1605	23.8165	5.965
Frequency (Hz)	12.8	11.3	9.3
Displacement (mm)	0.1761	0.3354	0.1021
Acceleration (g's)	0.116	0.172	0.036
Trigger >>> Peak	952.1	712.9	601.6

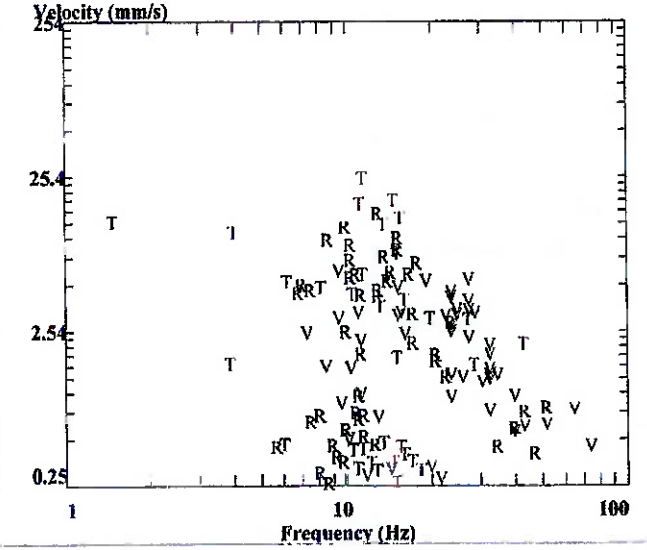
Air

Gain: 1 Air Trigger: N

Measurement	Value	Trigger >>> Peak	
		588.9	
kPA	0.135085		
dBL	136.6		
Hz	5.3		

Waveform Analysis / Frequency Plot





Attachment 6.2

Blast 22/01/2021 - Event 1

Version 4.1.1
Executable Date: 17Dec2015

File: c:\SuperGraphics.TMP\Tom Lynes passageway.NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: Tom Lynes, Rockmills

Unit #: 4142

22/01/2021 at 14:54:46 Event # 8

Location: Passageway

Operator: JC

Notes: Distance from blast to passageway 379m Bearing 77 degrees

Distance: N | *Wgt. Per Delay: N* | *Scaled Distance: 0.0*

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 17Nov20

Seismic

Gain: 1 Trigger: .508 mm/s ▽ Vector Sum: 0.82 mm/s @ 13.13 Hz

Channel	Radial	Transverse	Vertical
○ Velocity (mm/s)	0.762	0.635	0.381
Frequency (Hz)	7.50	13.40	0.00
Trigger >>> Peak	179.7	1.0	8.8

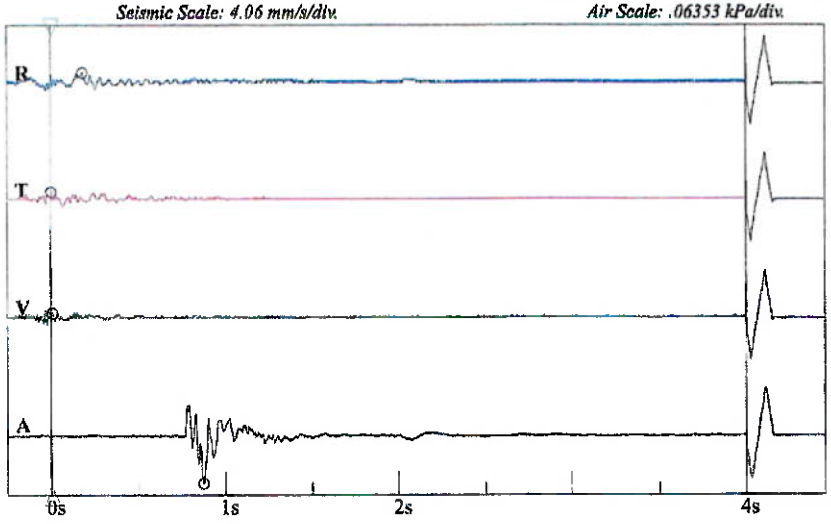
Air

Gain: 1 Air Trigger: 118 dBL

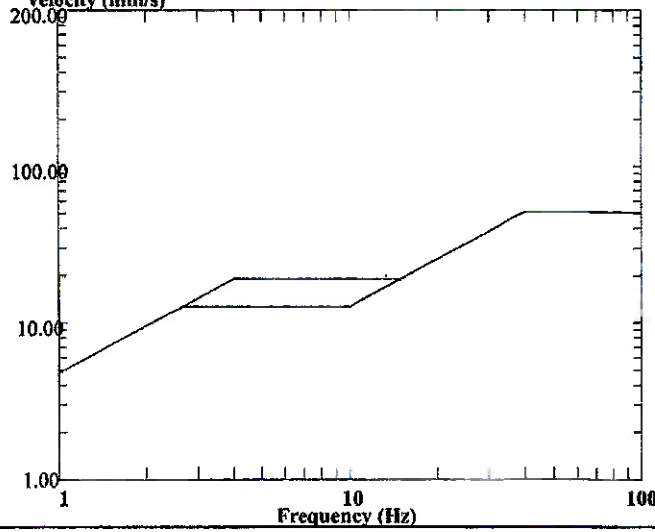
Measurement	Value	Trigger >>> Peak	
		877.0	
kPa	.0515		
dBL	128.2		
Hz	8.2		

Waveform Analysis / Frequency Plot

Seismic Scale: 4.06 mm/s/div. *Air Scale: .06353 kPa/div.*



USBM Limits (RI 8507, 1980)



Attachment 6.2

Blast 22/01/2021 - Event 2

Version 4.1.1
Executable Date: 17Dec2015

File: f:\Events\Evts 1-99\Tom Lynes canteen.ns8

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: Tom Lynes, Rockmills

Unit #: 21015 **22/01/2021 at 14:54:31 Event # 16**

Location: Canteen ***Operator: JC***

Notes: Distance from blast to canteen 379M. Bearing 77 degrees

Distance: N	*Wgt. Per Delay: N*	*Scaled Distance: 0.0*

Record Duration: 4.0 sec
Sample Rate: 1024/sec
Last Calibration: 05/11/2020

Seismic

Gain: 1 Trigger: .508 mm/s Vector Sum: 3.82 mm/s @ 10.89 Hz

Channel	Radial	Transverse	Vertical
Velocity (mm/s)	2.794	2.921	1.397
Frequency (Hz)	7.60	11.10	9.80
Trigger >>> Peak	351.6	335.0	336.9

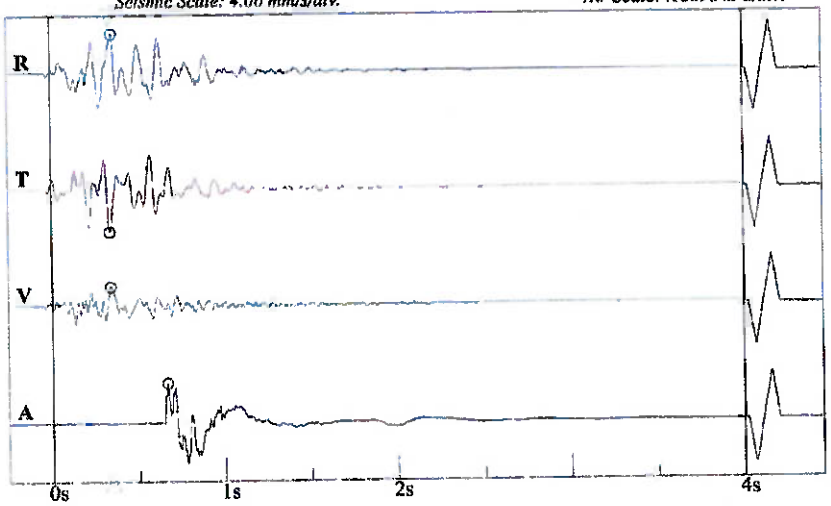
Air

Gain: 1 Air Trigger: 117 dBL

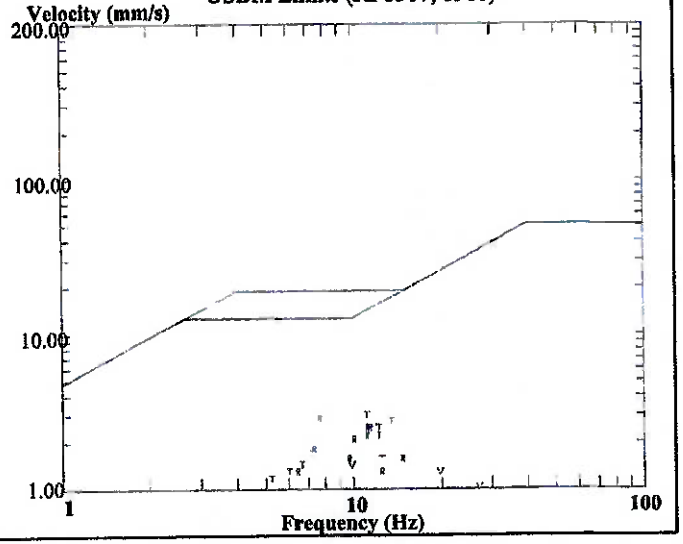
Measurement	Value	Trigger >>> Peak
		667.0
kPa	.088	
dBL	132.9	
Hz	6.7	

Waveform Analysis / Frequency Plot

Seismic Scale: 4.06 mm/s/div. *Air Scale: .12698 kPa/div.*



USBM Limits (RI 8507, 1980)



Attachment 6.2

Blast 08/03/2021 - Event 1

Version 4.1.1
Executable Date: 17Dec2015

File: c:\Nomis Seismographs\Rockmills Passageway.NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILLS LIMESTONE

Unit #: 4086

08/03/2021 at 16:06:05 Event # 2

Location: PASSAGEWAY

Operator: JC

Notes: Distance from blast to Passageway 316M. Bearing 231 degrees

Distance: N	Wgt. Per Delay: N	Scaled Distance: 0.0

Record Duration: 3.0 sec
Sample Rate: 1024/sec
Last Calibration: 04Feb21

Seismic

Gain: 1 Trigger: 1.27 mm/s ▽ Vector Sum: 1.43 mm/s @ 16.00 Hz

Channel	Radial	Transverse	Vertical
○ Velocity (mm/s)	1.397	0.635	0.508
Frequency (Hz)	16.50	17.60	64.00
Trigger >>> Peak	1.0	232.4	33.2

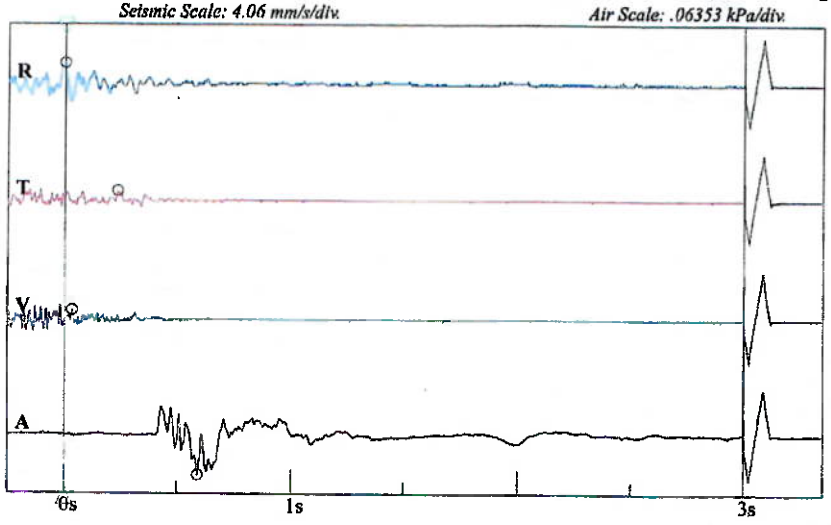
Air

Gain: 1 Air Trigger: N

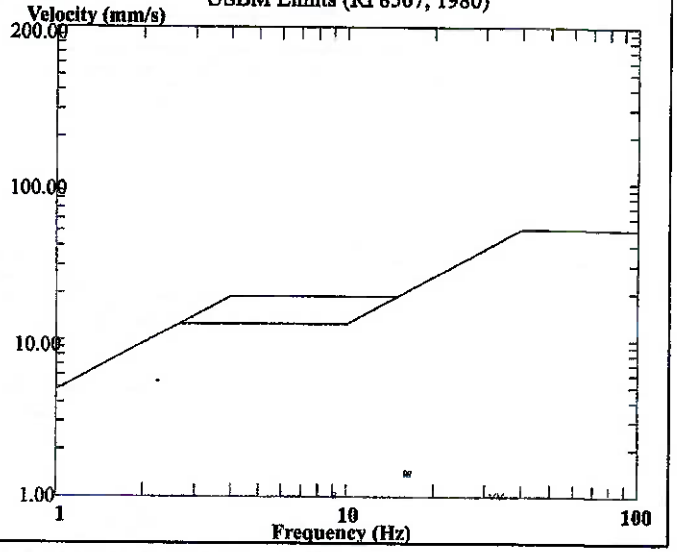
Measurement	Value	Trigger >>> Peak	
		589.8	
kPa	.0432		
dBL	126.7		
Hz	9.6		

Waveform Analysis / Frequency Plot

Seismic Scale: 4.06 mm/s/div Air Scale: .06353 kPa/div



USBM Limits (RI 8507, 1980)



Attachment 6.2

Blast 08/03/2021 - Event 2

Version 4.1.1
Executable Date: 17Dec2015

File: f:\Events\Evts 100-199\Rockmills Canteen 8-3-21.us8

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILLS LIMESTONE

Unit #: 21015

08/03/2021 at 16:05:44 Event # 145

Location: CANTEEN

Operator: JC

Notes: Distance from blast to canteen 161M. Bearing 255 degrees.

Distance: N | Wgt. Per Delay: N | Scaled Distance: 0.0

Record Duration: 3.0 sec
Sample Rate: 1024/sec
Last Calibration: 05/11/2020

Seismic

Gain: 1 | Trigger: 1.27 mm/s | ▽ Vector Sum: 9.67 mm/s @ 15.52 Hz

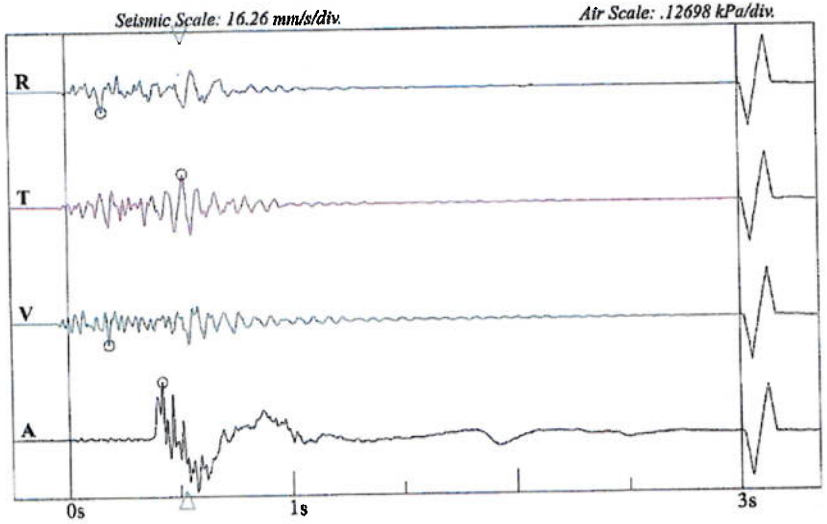
Channel	Radial	Transverse	Vertical
○ Velocity (mm/s)	5.969	9.017	6.223
Frequency (Hz)	13.80	15.50	28.40
Trigger >>> Peak	162.1	523.4	182.6

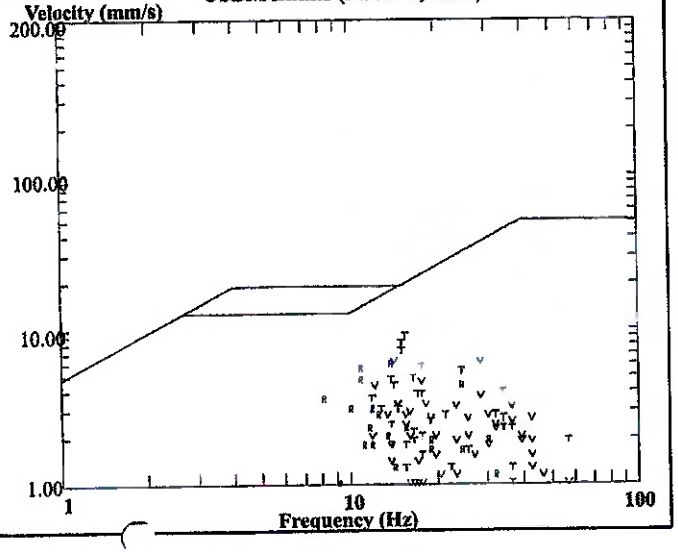
Air

Gain: 1 | Air Trigger: N

Measurement	Value	Trigger >>> Peak
		421.9
kPa	.1247	
dBL	135.9	
Hz	7.4	

Waveform Analysis / Frequency Plot





Attachment 6.2

Blast 12/08/2021

Version 4.1.1
Executable Date. 17Dec2015

File: c:\SuperGraphics.TMP\Rockmills office.NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILLS

Unit #: 4086

12/08/2021 at 15:12:56 Event # 3385

Location: OFFICE

Operator: JC

Notes: Distance 241M. Bearing 276 Degrees.

Distance: 130 m | Wgt. Per Delay: N | Scaled Distance: 0.0

Record Duration: 5.0 sec
Sample Rate: 1024/sec
Last Calibration: 04Feb21

Seismic

Gain: 2 | Trigger: 1.016 mm/s | ▽ Vector Sum: 7.61 mm/s @ 12.80 Hz

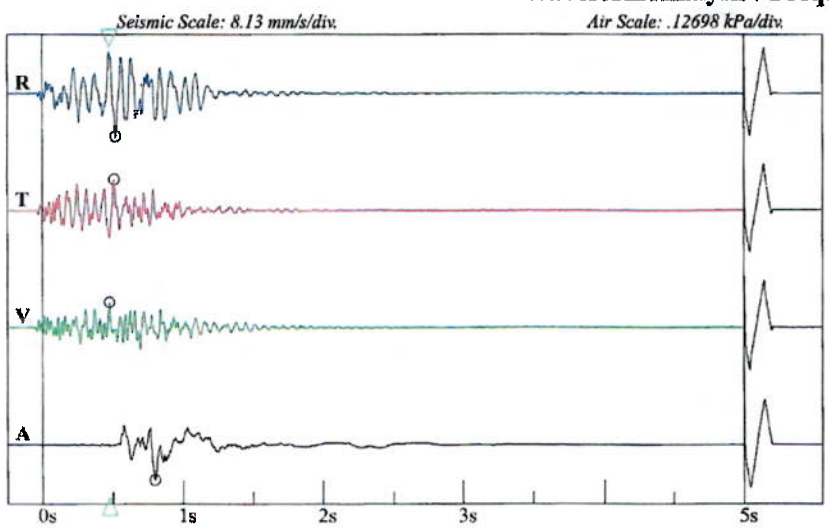
Channel	Radial	Transverse	Vertical
○ Velocity (mm/s)	5.969	4.318	3.493
Frequency (Hz)	10.60	11.90	18.90
Displacement (mm)	0.0896	0.0578	0.0294
Acceleration (g's)	0.041	0.033	0.042
Trigger >>> Peak	524.4	510.7	476.6

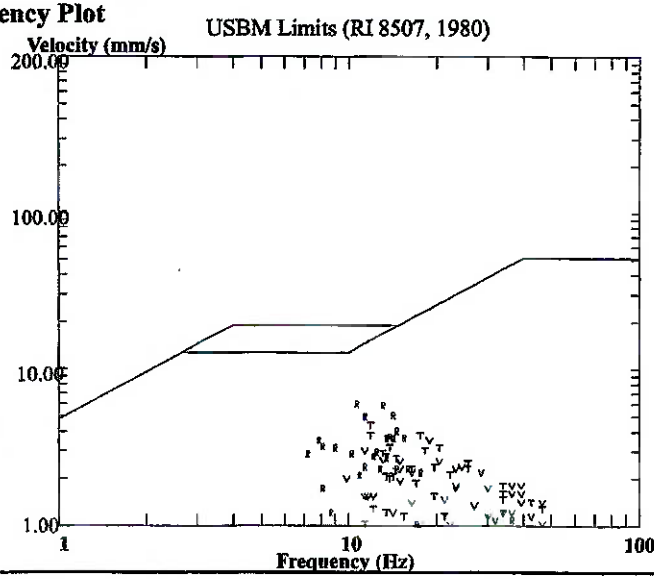
Air

Gain: 1 | Air Trigger: 122 dBL

Measurement	Value	Trigger >>> Peak	
		803.7	
kPa	.0762		
dBL	131.6		
Hz	3.4		

Waveform Analysis / Frequency Plot





Blast 24/11/2021

Version 4.1.1
Executable Date: 17Dec2015

File: c:\Downloads\19.NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILLS LIMESTONE

Unit #: 10548

24/11/2021 at 15:31:25 Event # 19

Location: CANTEEN

Operator: JC

Notes: Distance 187M. Bearing 257 Degrees

Record Duration: 3.0 sec
Sample Rate: 1024/sec
Last Calibration: 21Jul21

Distance: N | Wgt. Per Delay: N | Scaled Distance: 0.0

Seismic

Gain: 1 | Trigger: .508 mm/s | Vector Sum: 12.05 mm/s @ 12.80 Hz

Channel	Radial	Transverse	Vertical
Velocity (mm/s)	9.652	9.017	5.842
Frequency (Hz)	12.80	13.80	16.00
Displacement (mm)	0.1200	0.1040	0.0581
Acceleration (g's)	0.079	0.080	0.060
Trigger >>> Peak	337.9	327.1	403.3

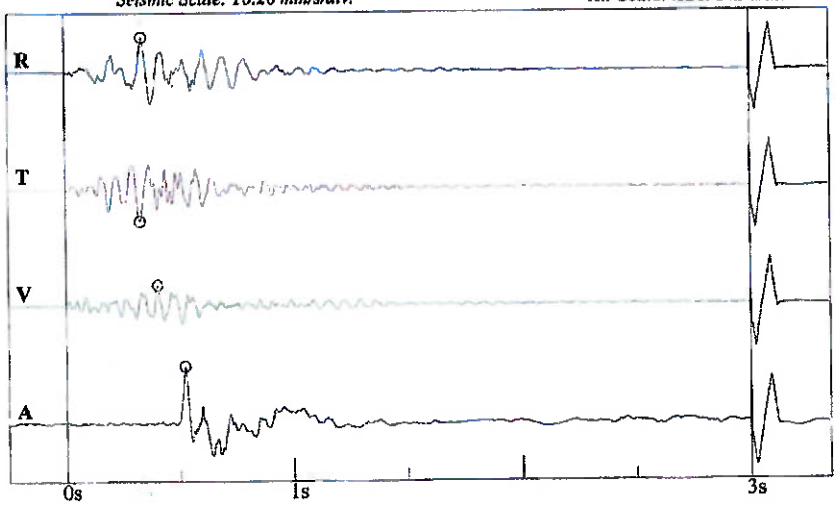
Air

Gain: 1 | Air Trigger: N

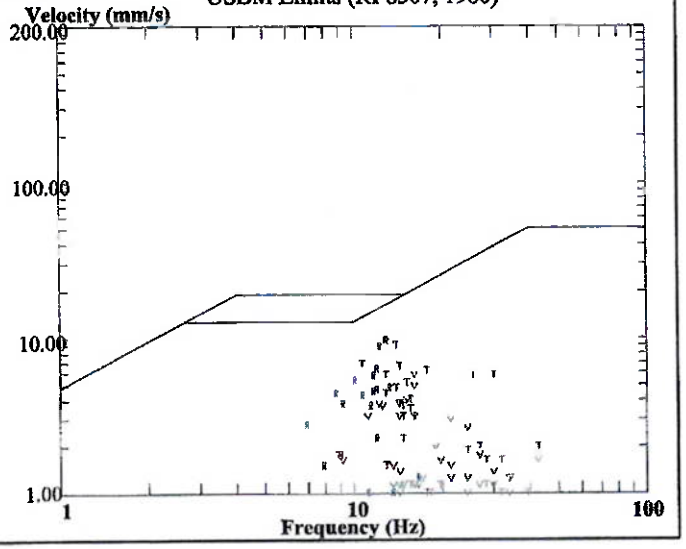
Measurement	Value	Trigger >>> Peak	
		524.4	
kPa	.1244		
dBL	135.9		
Hz	10		

Waveform Analysis / Frequency Plot

Seismic Scale: 16.26 mm/s/div. | Air Scale: .12698 kPa/div.



USBM Limits (RI 8507, 1980)



Attachment 6.2

Blast 15/02/2022

Version 4.1.1
Executable Date: 17Dec2015

File: c:\Downloads\10.NSZ

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Nomis Seismographs, Inc.

Company: ROCKMILLS

Unit #: 4166

15/02/2022 at 14:57:02 Event # 10

Location: OFFICE

Operator: JC

Notes: Distance 212M. Bearing 263 Degrees

Distance: N | Wgt. Per Delay: N | Scaled Distance: 0.0

Record Duration: 3.0 sec
Sample Rate: 1024/sec
Last Calibration: 14Dec21

Seismic

Gain: 2 Trigger: .572 mm/s Vector Sum: 5.8 mm/s @ 32.00 Hz

Channel	Radial	Transverse	Vertical
Velocity (mm/s)	4.064	3.937	4.445
Frequency (Hz)	15.50	23.20	34.10
Displacement (mm)	0.0417	0.0270	0.0207
Acceleration (g's)	0.040	0.058	0.097
Trigger >>> Peak	531.3	312.5	346.7

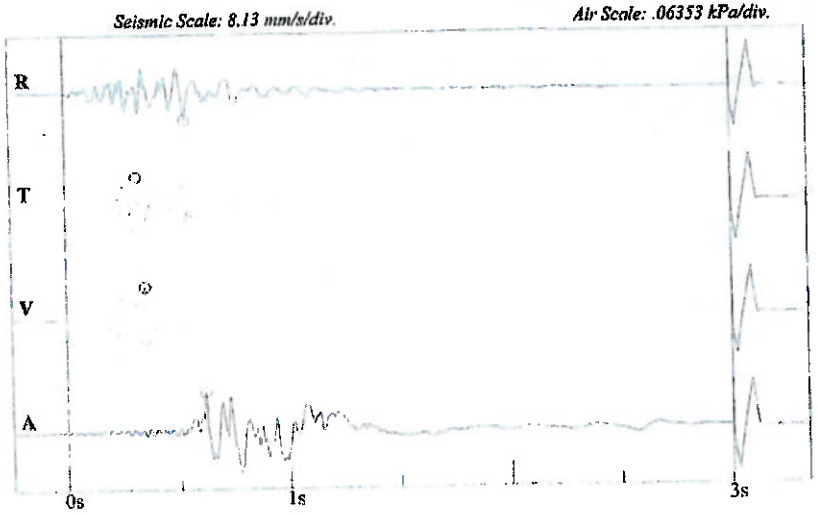
Air

Gain: 1 Air Trigger: 115 dBL

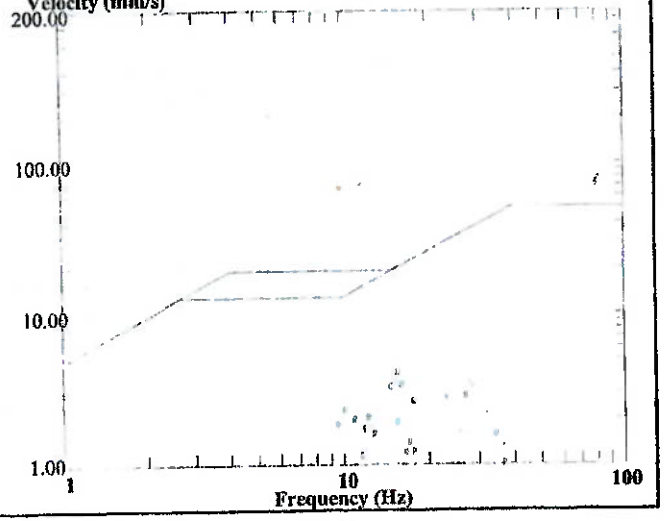
Measurement	Value	Trigger >>> Peak	
		612.3	
kPa	.0442		
dBL	126.9		
Hz	13.4		

Waveform Analysis / Frequency Plot

Seismic Scale: 8.13 mm/s/div. Air Scale: .06353 kPa/div.



USBM Limits (RI 8507, 1980)



Blast 06/05/2021

Version 4.1.1
Executable Date: 17Dec2015

File: c:\Nomis Seismographs\35.NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILL LIMESTONE

Unit #: 4141

06/05/2022 at 13:00:22 Event # 35

Location: MAIN OFFICE

Operator: JC

Notes: Distance 330M. Bearing 236 Degrees

Distance: N | Wgt. Per Delay: N | Scaled Distance: 0.0

Record Duration: 5.0 sec
Sample Rate: 1024/sec
Last Calibration: 14Dec21

Seismic

Gain: 2 | Trigger: .508 mm/s | Vector Sum: 4.52 mm/s @ 25.60 Hz

Channel	Radial	Transverse	Vertical
○ Velocity (mm/s)	3.239	3.937	4.509
Frequency (Hz)	11.30	24.30	25.60
Displacement (mm)	0.0456	0.0258	0.0280
Acceleration (g's)	0.023	0.061	0.074
Trigger >>> Peak	202.1	421.9	330.1

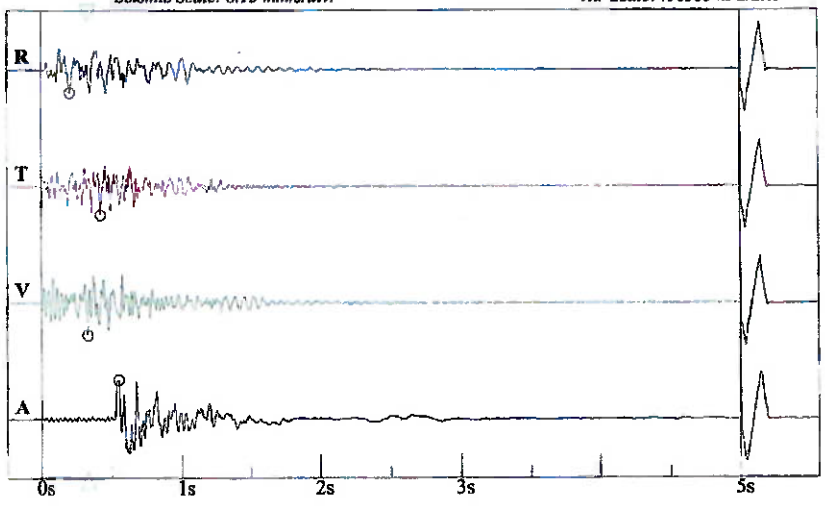
Air

Gain: 1 | Air Trigger: 120 dBL

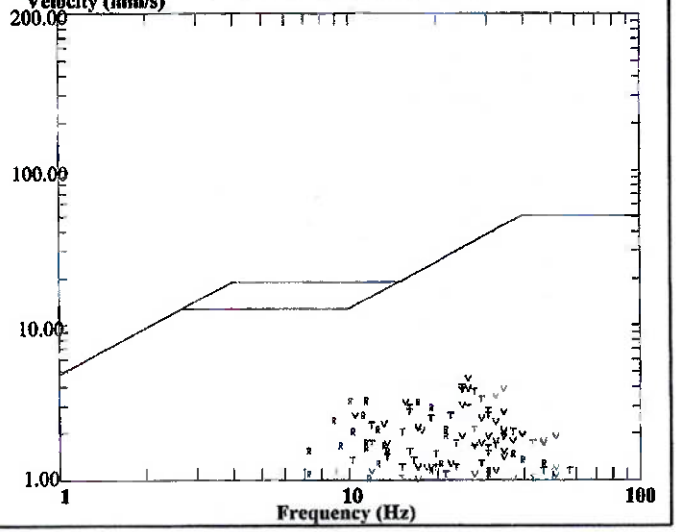
Measurement	Value	Trigger >>> Peak	
		547.9	
kPa	.0437		
dBL	126.8		
Hz	15		

Waveform Analysis / Frequency Plot

Seismic Scale: 8.13 mm/s/div. | Air Scale: .06353 kPa/div.



USBM Limits (RI 8507, 1980)



Attachment 6.2

Blast 14/02/2023

Version 4.1.1
Executable Date: 17Dec2015

File: e:\65(1).NSZ

Nomis Seismographs, Inc.

SuperGraphics - Report

Telephone: (205)592-2488 x 23

Company: ROCKMILLS LIMESTONE

Unit #: 4166

14/02/2023 at 14:31:39 Event # 65

Location: WEIGHTBRIDGE

Operator: JC

Notes: Distance 412M. Bearing 261 Degrees

Distance: N | Wgt. Per Delay: N | Scaled Distance: 0.0

Record Duration: 5.0 sec
Sample Rate: 1024/sec
Last Calibration: 16Jun22

Seismic

Gain: 2 Trigger: .572 mm/s Vector Sum: 1.36 mm/s @ 34.13 Hz

Channel	Radial	Transverse	Vertical
Velocity (mm/s)	1.143	0.889	0.826
Frequency (Hz)	23.20	36.50	36.50
Displacement (mm)	0.0078	0.0039	0.0036
Acceleration (g's)	0.017	0.021	0.019
Trigger >>> Peak	164.1	183.6	187.5

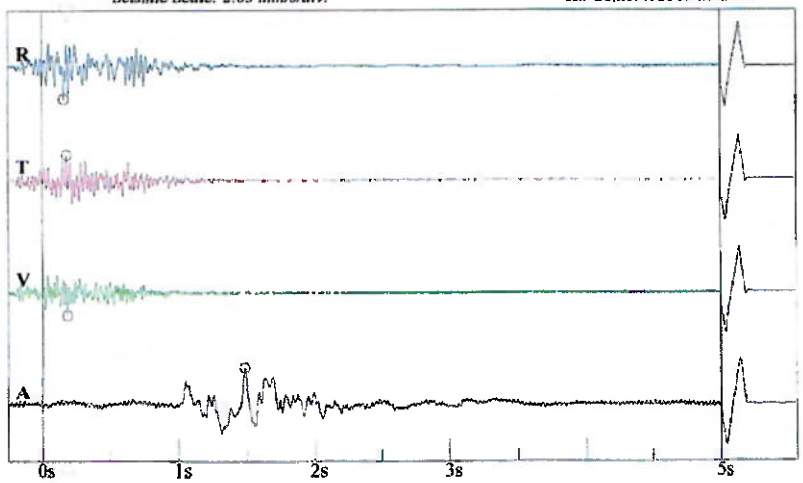
Air

Gain: 1 Air Trigger: N

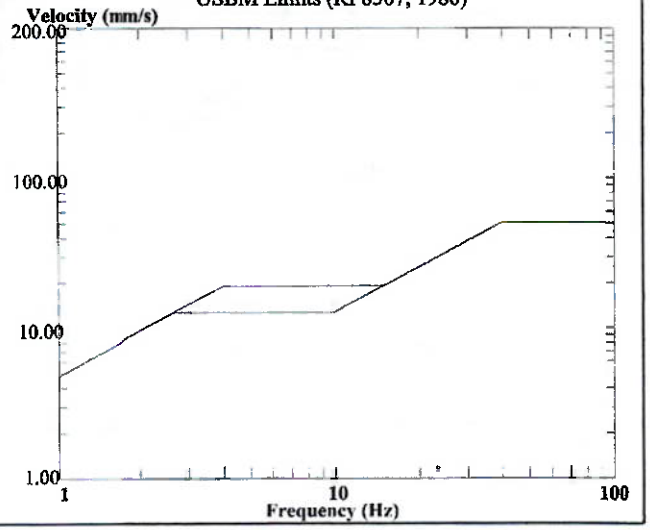
Measurement	Value	Trigger >>> Peak	
		1486.3	
kPa	.0105		
dBL	114.4		
Hz	8.8		

Waveform Analysis / Frequency Plot

Seismic Scale: 2.03 mm/s/div. Air Scale: .01585 kPa/div.



USBM Limits (RI 8507, 1980)



Attachment 6.2

ATTACHMENT 7.0

- LANDSCAPE & VISUAL ATTACHMENTS -

ATTACHMENT 7.1

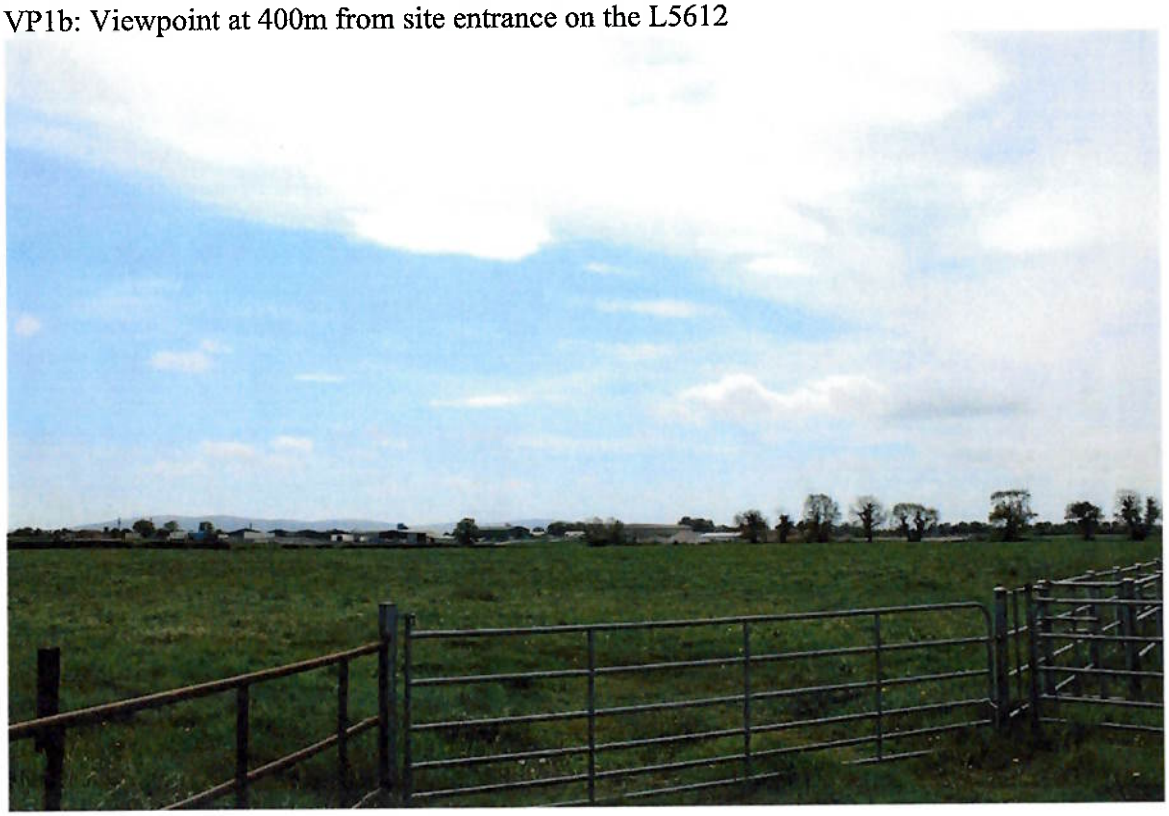
- LANDSCAPE & VISUAL SURVEY INFORMATION -

Attachment 7.1.1: Landscape & Visual Survey Locations

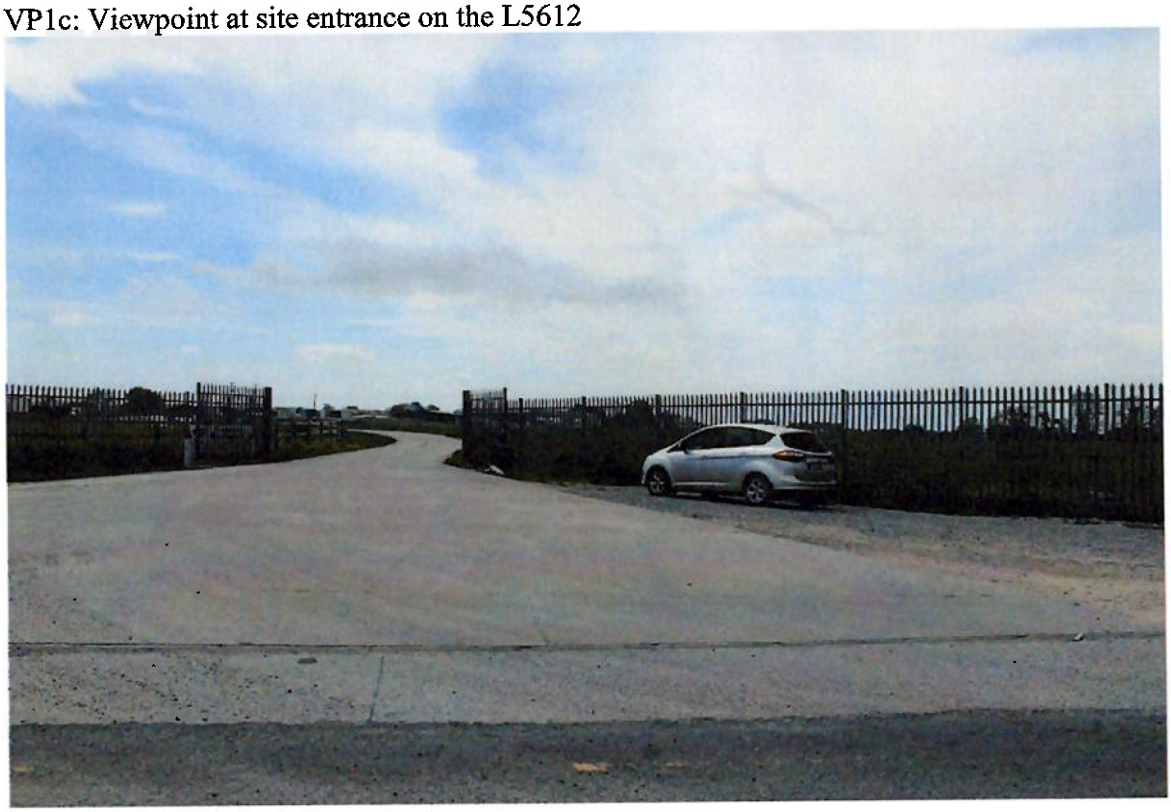
VP1a-1: Viewpoint at Junction of R512 and L5612

VP1a-2: Viewpoint at Junction of R512 and L5612

VP1b: Viewpoint at 400m from site entrance on the L5612



VP1c: Viewpoint at site entrance on the L5612



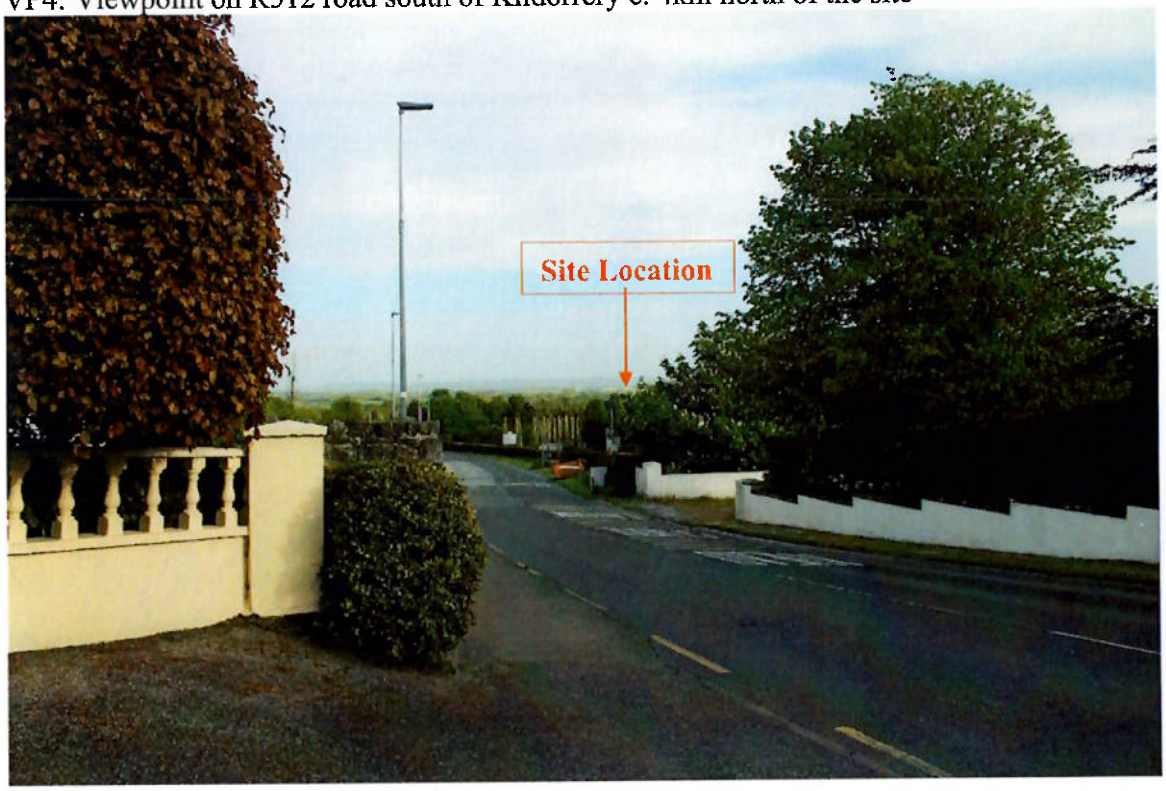
VP2a: Viewpoint at closest Residence c. 550m north of the site

VP2b-1: Viewpoint at L95121-3 road near Residence c. 750m north / north-west of the site

VP2b-2: Viewpoint at L95121-3 road near Residence c. 750m north / north-west of the site

VP3: Viewpoint at farm hub near Residences c. 650-700m south of the site

VP4: Viewpoint on R512 road south of Kildorrery c. 4km north of the site



ATTACHMENT 8.0

- BIODIVERSITY ATTACHMENTS -

ATTACHMENT 8.1

- NATIONAL ROADS AUTHORITY GUIDELINES -

Attachment 8.1.1: Examples of valuation at different geographical scales

Ecological valuation: Examples

International Importance:

- **'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation and Proposed Special Protection Area (pSPA).**
- **Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).**
- **Features essential to maintaining the coherence of the Natura 2000 Network.[1]**
- **Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.**
- **Resident or regularly occurring populations (assessed to be important at the national level) [2] of the following:**

o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.

- **Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).**
- **World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).**
- **Biosphere Reserve (UNESCO Man & The Biosphere Programme).**
- **Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).**
- **Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).**
- **Biogenetic Reserve under the Council of Europe.**
- **European Diploma Site under the Council of Europe.**
- **Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[3]**

National Importance:

- **Site designated or proposed as a Natural Heritage Area (NHA).**
- **Statutory Nature Reserve.**
- **Refuge for Fauna and Flora protected under the Wildlife Acts.**
- **National Park.**
- **Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.**
- **Resident or regularly occurring populations (assessed to be important at the national level)[4] of the following:**
  - **Species protected under the Wildlife Acts; and/or**
  - **Species listed on the relevant Red Data list.**
- **Site containing 'viable areas'[5] of the habitat types listed in Annex I of the Habitats Directive.**

County Importance:

- **Area of Special Amenity.[6]**
- **Area subject to a Tree Preservation Order.**
- **Area of High Amenity, or equivalent, designated under the County Development Plan.**
- **Resident or regularly occurring populations (assessed to be important at the County level)[7] of the following:**
  - **Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;**
  - **Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;**
  - **Species protected under the Wildlife Acts; and/or**
  - **Species listed on the relevant Red Data list.**
- **Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.**
- **County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, [8] if this has been prepared.**
- **Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.**
- **Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.**

Local Importance (higher value):

- **Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;**
- **Resident or regularly occurring populations (assessed to be important at the Local level)[9]of the following:**
  - **Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;**
  - **Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;** o **Species protected under the Wildlife Acts; and/or**
  - **Species listed on the relevant Red Data list.**
- **Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;**
- **Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.**

Local Importance (lower value):

- **Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;**
- **Sites or features containing non-native species that are of some importance in maintaining habitat links.**

1 See Articles 3 and 10 of the Habitats Directive.

2 It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

3 Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

4 4It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

5 A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

6 It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

7 It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

8 BAP: Biodiversity Action Plan

9 It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle

ATTACHMENT 8.2

- NOISE MONITORING INFORMATION -

Attachment 8.2.1: Site Photographs

Photo 1 showing uncut grassland with prominent Sycamore treeline (A-B)

Photo 2 Section of Ash treeline (G-H) with signs of Ash die back disease

Photo 3. Existing active quarry with vegetated berm along western boundary.

Photo 4. High quality hedgerow along external boundaries

Photo 5. Site access road

Photo 6. Vegetation berm on western boundary of existing quarry (looking north)

Photo 7. Vegetation berm on western boundary of existing quarry (looking south)

Photo 8. Wider berm on northern boundary of existing quarry

Photo 9. Sand Martin nest holes in stockpiles

Photo 10. Existing active quarry

Photo 11. Existing active quarry

ATTACHMENT 12.0

- MATERIAL ASSETS (TRAFFIC) -

ATTACHMENT 12.1

- ROAD TRAFFIC REPORT -

MmcC

Murphy McCarthy Consulting Engineering Ltd.

EastPark House, Marina Commercial Park, Centre Park Road, Cork.
Telephone: 021-4317992 Fax: 021-4311410 Email: info@murphymccarthy.com
Web: www.murphymccarthy.ie

Building, Civil and Structural • Project Management • Environmental Consultants • Cost Control • Health & Safety • Fire Engineering

ROAD AND TRAFFIC REPORT

EXTENSION AND CONTINUATION OF EXISTING QUARRY

AT

CARRIGDOWNANE UPPER
ROCKMILLS
KILDORRERY
CO CORK

FOR

MR DENIS O'KEEFFE

MARCH 2023
PROJECT 221099

ROAD AND TRAFFIC REPORT

1.0 Introduction:

1.1 Murphy McCarthy Consulting Engineers on behalf of Mr Denis O'Keeffe intend to apply for Planning Permission to Cork County Council to continue to operate and to extend the existing limestone quarry in Carrigdownane Upper, Rockmills, Kildorrery, Co. Cork.

1.2 Murphy McCarthy were commissioned to deal with the relevant roads and traffic issues.

2.0 Site Location:

2.1 The existing quarry is located in the Townland of Carrigdownane Upper, Rockmills, Kildorrery, Co. Cork.

2.2 The site is surrounded by lands which are primarily used for agricultural activities. On the southern boundary an existing licensed industrial recycling plant is located.

2.3 The site itself has no road frontage, but is linked to the existing public road to the east of the site by an existing private concrete roadway which also serves the already existing recycling industrial facility.

2.4 There is a wheel wash on the western end of the access roadway.

2.5 There is a weighbridge serving the facility.

3.0 Existing Road Network:

3.1 The existing private roadway exits to the public local road L5612.

3.2 The existing vehicular entrance was granted Planning Permission, Ref. No. 07 / 5422. Suitable sightlines are available. Its use as a quarry entrance was confirmed in Planning Ref. 15 / 5484.

3.3 The existing entrance was in poor condition. It has recently been upgraded by the addition of extra reinforced concrete pavement, and is now fully fit for purpose Please see Drawing 221099-P08 Rev A attached.

3.4 The local road runs northwards to meet the R512, Kildorrery to Glanworth Road, approximately 950m away. Please refer to attached extract from the Discovery Series Ordnance Maps Ref. No. 72 in which the site and local access roads are highlighted.

3.5 The local primary road (L5612) has a typical black top width of 4.7m average. The road was surveyed. It was observed to narrow to 4m wide at one pinch point, but generally varied from 4.6m to 4.9m wide. A minimum clear distance between the hedgerows/fences was measured at 6.5m, with an average clear dimension available of 7.5m.

3.6 There are no public lighting, footpaths or road markings (except at the R512 junction) within the study area.

3.7 A statutory speed limit of 80km/hr governs the L5612, but in reality the average speed is much lower and is in the order of 50km/hr.

3.8 In compliance with conditions agreed with the Area Engineer re Planning Permission Ref 15 / 5484.

- The Local Roadway L5612 was improved to provide 5 number passing bays between the site entrance and the junction with the R512.
- All HGV traffic exiting the site turns left.
- The junction with the R512 was upgraded to provide the necessary safe sightlines. A legal agreement is in place with the relevant landowners to ensure the continued delivery of such sightlines.

4.0 Existing Traffic Flows:

4.1 A traffic count was undertaken at the site entrance on Tuesday 21st June 2022 between 7am and 9.30am. Because of the rural nature of the site, most of the surrounding land use being agricultural, there are no seasonal peak factors affecting traffic flow as there would be on a commuter, urban or tourist route. The results of the traffic count are shown summarised on Drawing No. 221099-21 attached.

The count indicated approx. 55 traffic movements over a two and a half hour period on the L5612 with an approximate 35% HGV content.

On the L5612, north of the site entrance 55 vehicle movements were observed over a two and a half hour period, and 44 vehicle movements to the south of the site entrance. On this road the average HGV content north of the site entrance was 8 no. per hour and south of the entrance 4 no. per hour.

4.2 From local knowledge and in keeping with local land uses in the area, a milk lorry, an animal feed lorry, an oil lorry, some farm machinery and lorries from the Crossmore Tyre Recycling facility together with the quarry traffic, regularly use the local L5612 road, without any reported difficulties.

4.3 There is no traffic accident history on L5612.

4.4 A second traffic count was carried out on the morning of Thursday 5th January 2023. See Drawing 221099-22 attached. The schools had reopened. It was expected that the traffic volumes might vary from the previous count, as the Kildorrey to Mallow Road was closed and it was anticipated that a portion of the diverted traffic might use the L5612.

In reality, there was no extra traffic loading from the previous survey, and the findings expressed in items 4.1 to 4.3 above continue to hold good.

5.0 Existing Network Capacity:

5.1 In order to estimate the capacity of the road network, we consulted: RT180 – Geometric Design Guidelines (Classification, Alignment, Cross Section).

5.2 For a Level of Service "C" undivided rural road with 0.0% sight distance greater than 460m, Table C4.2 estimates the capacity of a 5.0m wide carriageway as being 550 passenger car units per hour (pcu/hr)* in two directions. Therefore if we apply this rate per meter width to the existing road within the study area we can estimate the existing road capacities as shown in Table 1 below:-

TABLE 1 – ROAD CAPACITY ESTIMATES			
ROAD NO.	**CARRIAGEWAY WIDTH (m)**	**ESTIMATED CAPACITY (pcu/hr) ***	**EXISTING TRAFFIC FLOWS (pcu/hr)***
Local Road L5612	4.7	500	35

* Note for this study, we assume 1hgv is equivalent to 2.5 pcu's

Based on the traffic count, the existing traffic is 20HGV = 50pcu + 37 cars = 87 pcu's over 2.5 hours or 35 pcu's per hour.

5.3 From Table 1 above, we can compare the existing traffic volumes with the network capacity and can see that there is significant spare capacity to cater for additional traffic on the road network.

6.0 Proposed Development:

6.1 Proposed use and access arrangement.

6.1.1 It is proposed to retain and extend the existing quarry facility, including the existing internal access roadway. The existing weighbridge on site, located within the site adjoining the access roadway will be used. Control of the weighbridge will be achieved by remote indication to the office in the Portacabin located within the quarry area proper.

6.1.2 The existing site entrance will be retained unchanged.

6.2 New Traffic Loading:

6.2.1 The intended average extraction rate is 150,000 tonnes per annum. Assuming a 20 tonne load per truck, and 250 working days per annum, this gives an average of 600 tons per day (30 loads per day) is expected, equivalent to 60 no. truck movements per day. Assuming a 6 hour working day minimum, the HGV traffic loading may be conservatively estimated at maximum 10 no. lorry movements per hour, or 5 loads per hour.

6.2.2 There are approx. 5 or 6 staff employed by Rockmills Quarries, and another 5 by Crossmore Tyres, and approx. 12 drivers. This gives a max car use of 22 entering in the morning, and the same leaving in the evening.

In reality, 20 lorry drivers arrive by lorry, and staff car share, so the 13 cars counted in the traffic survey is more typical of what can be expected.

6.2.3 As per 6.2.1 above, there are expected to be 10 lorry movements per hours, or 25 pcu's / hr, of combined in and out traffic.

The cars will tend to come to work at the same time, thus the car loading may be as high as say 15 pcu's / hr.

Thus the max total traffic loading is expected to be approx. 40 pcu's / hr.

7.0 Conclusions:

7.1 The existing roads system works well. There are no records of accidents on the L5612. There are no complaints from local residents.

7.2 The existing quarry is efficiently operated. There is a concrete roadway and wheel wash serving the quarry, all loads are sprayed with water at the wheel wash before leaving the site. There is no evidence of quarry activity (dirty roads) on the existing roads outside the quarry entrance.

7.3 The total proposed loading of 40 pcu's / hr (which includes existing quarry traffic) will have negligible impact on the local road network, which as per Table 1 above, has a spare capacity of 500-35 = 465 pcu's / hr.

7.4 We conclude that the existing road network can safely and comfortably cater for the proposed extension.

Signed: _____

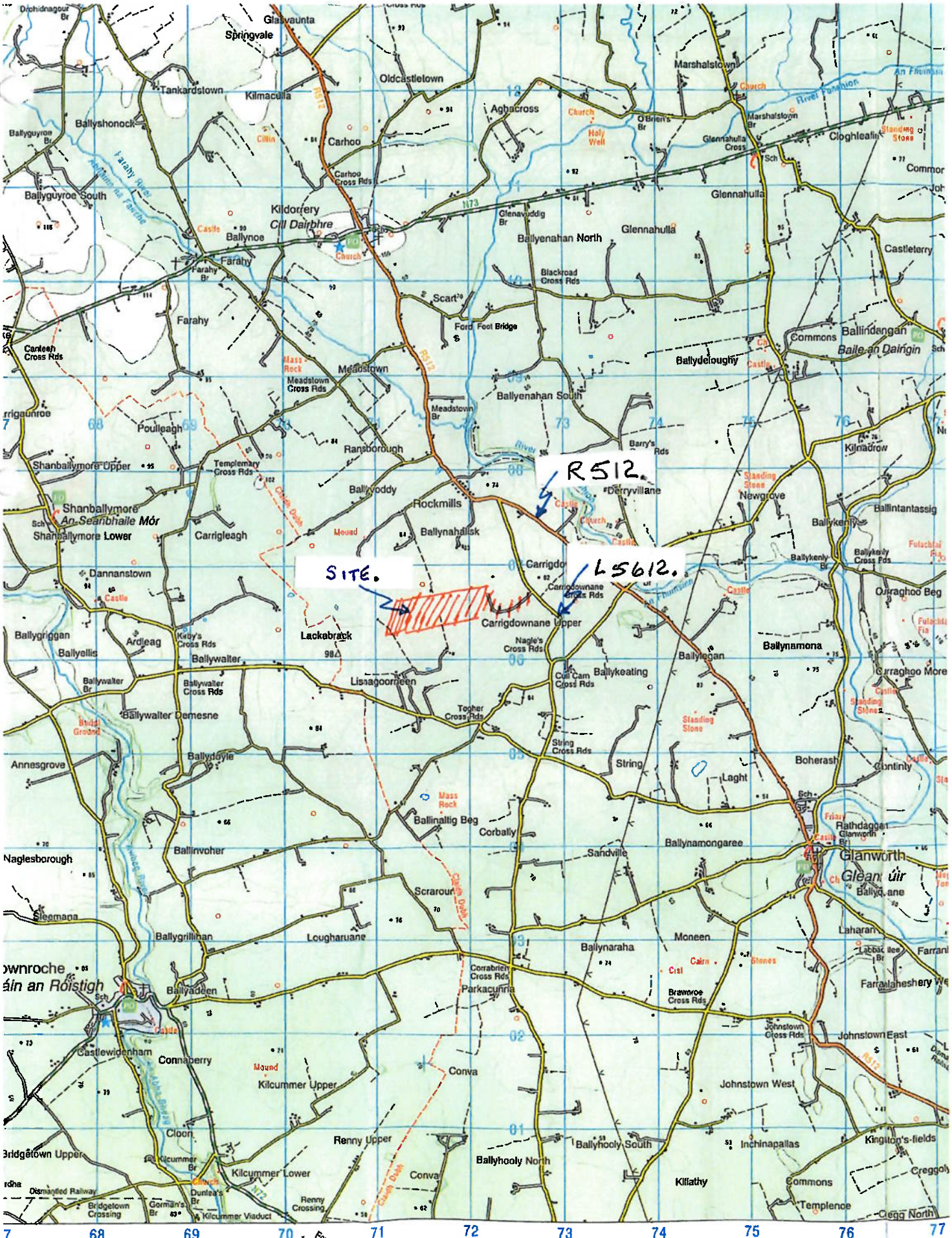
Tim Murphy B.E, C.Eng., F.I.E.I.
Murphy McCarthy Limited

March 23rd 2022

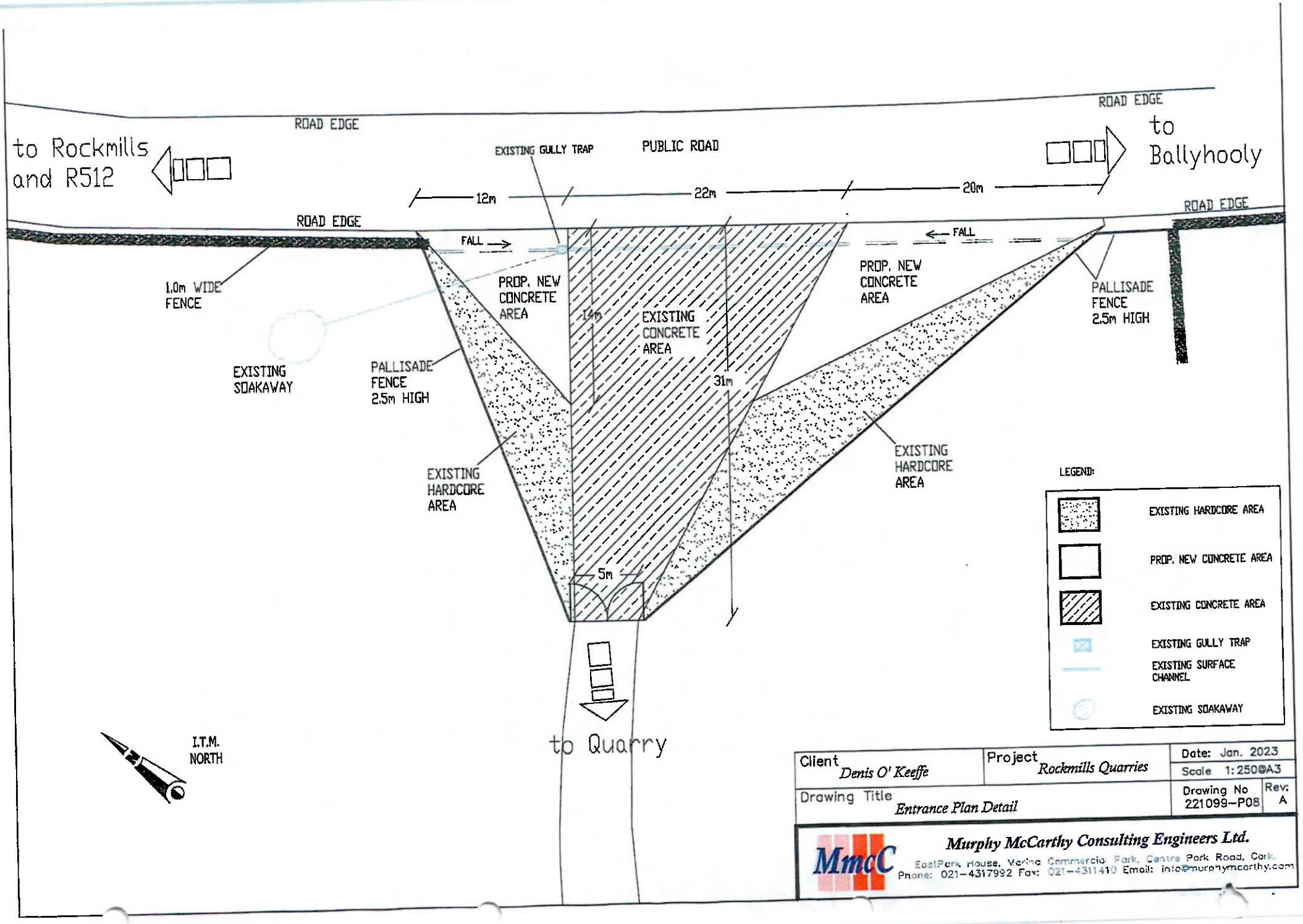
221099

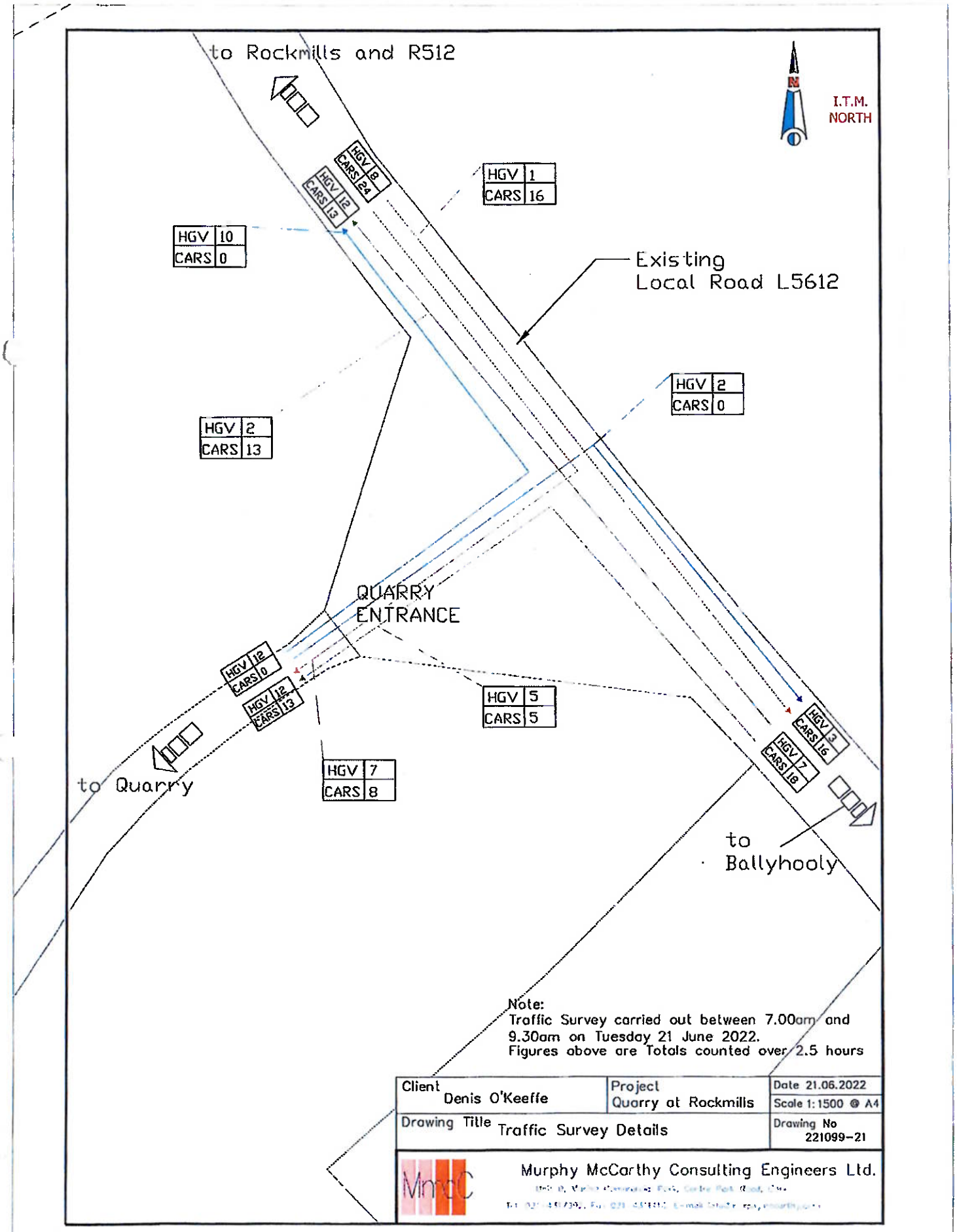
ATTACHMENT 12.2

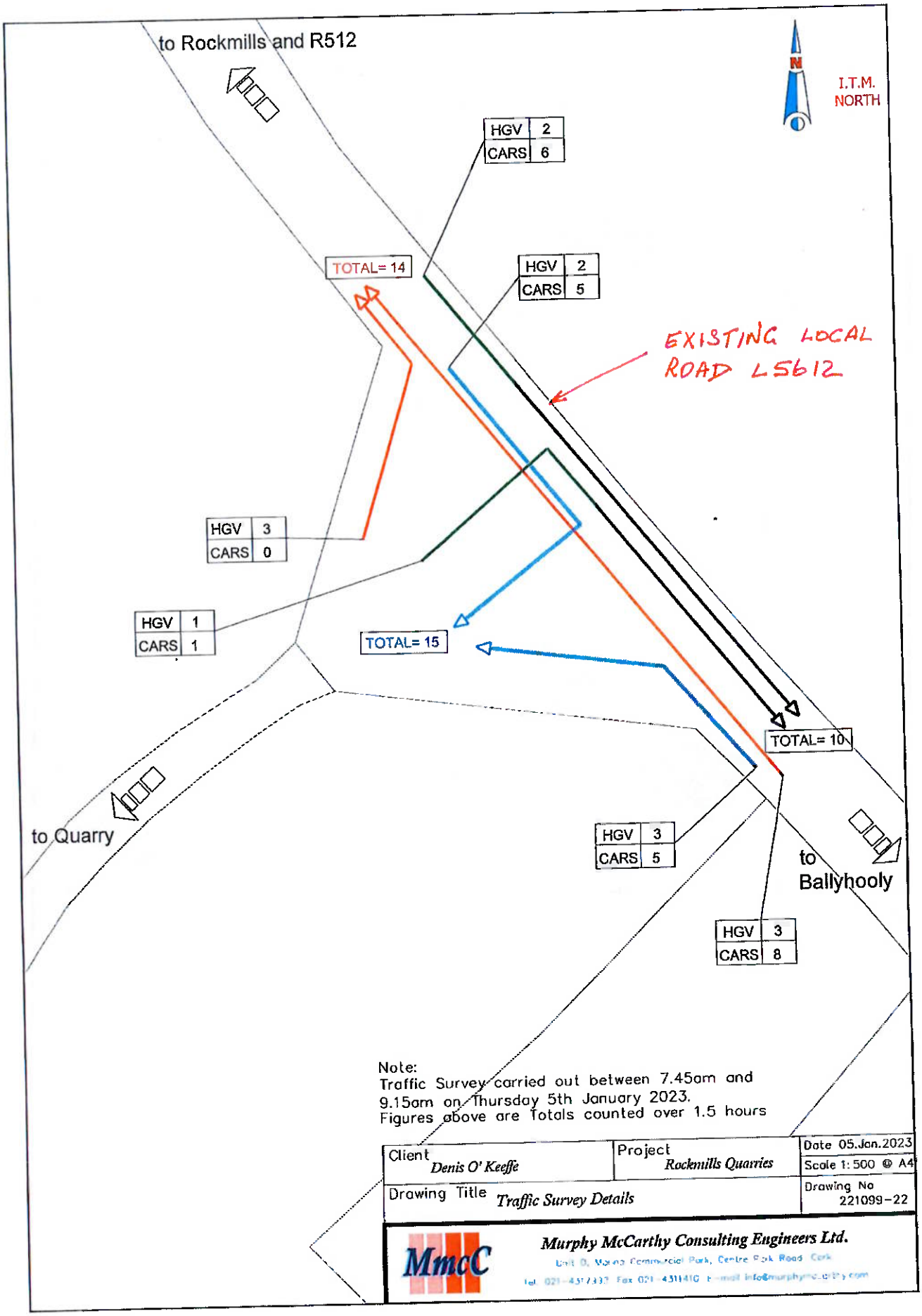
- TRAFFIC REPORT ATTACHMENTS -



EXTRACT FROM OS DISCOVERY NO 72.


ROAD EDGE
to Rockmills and R512
EXISTING GULLY TRAP
PUBLIC ROAD
ROAD EDGE
to Ballyhooly
12m
22m
20m
ROAD EDGE
ROAD EDGE
FALL
FALL
1.0m WIDE FENCE
PROP. NEW CONCRETE AREA
14m
EXISTING CONCRETE AREA
PROP. NEW CONCRETE AREA
PALLISADE FENCE 2.5m HIGH
EXISTING SOAKAWAY
PALLISADE FENCE 2.5m HIGH
31m
EXISTING HARDCORE AREA
EXISTING HARDCORE AREA
5m
LEGEND:
EXISTING HARDCORE AREA
PROP. NEW CONCRETE AREA
EXISTING CONCRETE AREA
EXISTING GULLY TRAP
EXISTING SURFACE CHANNEL
EXISTING SOAKAWAY
I.T.M. NORTH
to Quarry
Client Denis O' Keeffe
Project Rockmills Quarries
Date: Jan. 2023
Scale 1:250@A3
Drawing Title Entrance Plan Detail
Drawing No 221099-P08
Rev: A
Murphy McCarthy Consulting Engineers Ltd.
EastPark House, Waring Commercial Park, Centre Park Road, Cork.
Phone: 021-4317992 Fax: 021-4311410 Email: info@murphymccarthy.com


to Rockmills and R512
I.T.M.
NORTH
HGV 9
CARS 24
HGV 12
CARS 13
HGV 1
CARS 16
HGV 10
CARS 0
Existing
Local Road L5612
HGV 2
CARS 0
HGV 2
CARS 13
QUARRY
ENTRANCE
HGV 12
CARS 0
HGV 12
CARS 13
HGV 5
CARS 5
HGV 3
CARS 16
HGV 7
CARS 18
HGV 7
CARS 8
to Quarry
to
Ballyhooly
Note:
Traffic Survey carried out between 7.00am and 9.30am on Tuesday 21 June 2022.
Figures above are Totals counted over 2.5 hours
Client
Denis O'Keeffe
Project
Quarry at Rockmills
Date 21.06.2022
Scale 1:1500 @ A4
Drawing Title
Traffic Survey Details
Drawing No
221099-21
Murphy McCarthy Consulting Engineers Ltd.


to Rockmills and R512
I.T.M.
NORTH
HGV 2
CARS 6
TOTAL= 14
HGV 2
CARS 5
EXISTING LOCAL ROAD L5612
HGV 3
CARS 0
HGV 1
CARS 1
TOTAL= 15
TOTAL= 10
to Quarry
HGV 3
CARS 5
to Ballyhooly
HGV 3
CARS 8
Note:
Traffic Survey carried out between 7.45am and 9.15am on Thursday 5th January 2023.
Figures above are totals counted over 1.5 hours
Client Denis O' Keeffe
Project Rockmills Quarries
Date 05.Jan.2023
Scale 1:500 @ A4
Drawing Title Traffic Survey Details
Drawing No 221099-22
MmcC
Murphy McCarthy Consulting Engineers Ltd.
Unit D, Maina Commercial Park, Centre Park Road Cork
Tel 021-4317332 Fax 021-4311410 E-mail info@murphymc.com