Environmental Impact Assessment Report

Volume 2 of 3 – Main Report

For

FURTHER DEVELOPMENT OF UMMERA GRAVEL PIT MACROOM, COUNTY CORK

Prepared for:
Drimoleague Concrete Works Limited
Bredagh Cross
Drimoleague
County Cork

Prepared by:
Keohane Geological & Environmental Consultancy
Ivy House
Clash
Carrigrohane
County Cork

September 2020

Environmental Impact Assessment Report

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EXECUTIVE SUMMARY

The subject of this Environmental Impact Assessment Report (EIAR) is the further development of the Ummera gravel pit, located near Macroom County Cork. The gravel pit is owned and operated by Drimoleague Concrete Works Ltd (DCWL). The EIAR is prepared in support of the Section 37L planning permission application for the gravel pit. A substitute consent application was submitted for the gravel pit in accordance with An Bord Pleanala decision (dated 24 February 2014) to uphold the Council's determination (dated 23 August 2012) requiring DCWL to apply for substitute consent. The application for substitute consent was submitted to An Bord Pleanala in August 2020. In accordance with Section 37L of the Planning & Development (Amendment) (No. 2) Regulations 2015, an application is being made for further development of the Ummera gravel pit. The application extends to 15.5 hectares (ha) and includes for the continued extraction within the existing footprint, expansion into approximately 2ha of mostly agricultural land, processing of gravel, use of existing site infrastructure, construction of a fuel storage shed, concrete refuelling pad and pavement of access road, and restoration of the site. A 15-year lifespan is sought for the further development.

Gravel has been extracted from the Ummera site since the 1940's. Murnane & O'Shea Ltd (M&OS) (an affiliate of DCWL) became involved in the site in or around 1978. M&OS leased a portion of the land, including an existing gravel pit, and continued extraction activities at the northwest corner of the site. In 1978, M&OS applied for and secured planning permission for '*Gravel Plant in Existing Pit*' (i.e. a washing plant) – planning number 1365/78 refers. The washing plant installed with the benefit of that planning permission is that still used at the gravel pit. Furthermore, it is the only washing plant at the site, so intensification cannot be said to have occurred. Fluctuations in production down through the years is a function of economic activity.

Prior to the 1978 permission, in 1976, a competitor (Daniel & Sean Lordan) applied for planning permission for '*Opening of Gravel Pit*' nearby and in the same landholding – planning number 375/76 refers. Permission was granted, but was not commenced, so lapsed on 07 April 1981; no gravel extraction occurred within the area subject of planning 375/76 within that 5-year period (i.e. no extraction occurred within the red-line boundary of 375/76).

Since its interest in the site from 1978, M&OS/DCWL has maintained a continuous presence at the Ummera gravel pit. DCWL registered the gravel pit in 2005 – QR01 refers. In August 2020, DCWL applied for substitute consent as directed by the planning authorities.

The Applicant

The applicant for this further development of Ummera gravel pit is DCWL. DWCL is based at Bredagh Cross, Drimoleague where it operates a concrete ready-mix and concrete products manufacturing facility. It also operates a few quarries / gravel pits in the West Cork region, including Ummera gravel pit. DCWL is involved in the supply of raw materials for the construction industry in West Cork. These projects require the use of large volumes of concrete, aggregate and concrete products. The supply of such raw materials is critical for the continued development of, for example, residential housing and infrastructure on both a local and regional scale. DCWL meet this demand with the operation of a number of rock quarries, gravel pits and production facilities in West Cork. The company provides an important service in meeting the development needs of the region.

The Consultants

Keohane Geological & Environmental Consultancy (KGEC) (Ivy House, Clash, Carrigrohane) is a Cork-based consultancy specialising in geological and environmental sciences. In recent years, Keohane Geological & Environmental Consultancy has prepared planning applications and/or EISs for several quarries / gravel pits in Munster.

Atkins
Atkins is a multinational engineering and design consultancy, providing expertise to help resolve complex challenges presented by the built and natural environment. Atkins leads the way across a diverse range of disciplines, including architecture, environment, transport and roads, water, engineering and quantity surveying. Atkins is involved in a wide variety of projects from architects designing the world's tallest buildings to improving the efficiency of major public transport systems. Atkins Ireland currently has offices in Dublin, Cork and Galway. Atkins Ireland possesses a significant breadth of knowledge and depth of skills and experience for the ultimate benefit of our clients. We offer our skills over the full spectrum of client requirements, from one expert for one day to the planning, implementation and long-term management of major projects.

Atkins has provided ecological support in the preparation of the EIAR for the further development of Ummera gravel pit. In Ireland, the Atkins Ecology team has developed considerable experience and a proven track record in providing specialist ecological consultancy and undertaking high quality ecological work for a range of clients. Our ecology team provided specialist ecological advice; undertakes ecological assessments and surveys, and provides ecological solutions to meet the project needs and balance the ecological impacts against likely biodiversity gains. In addition to our locally based ecological staff, we can also draw on over 70 professional and experienced ecologists in the UK thus providing access to substantial additional resources and specific environmental expertise to meet the needs and resources required by a given project. Atkins also routinely works with a range of specialist ecological consultants in order to provide our Clients with the expertise appropriate to specific project requirements (e.g. the need to undertake bat surveys).

Damian Brosnan Acoustics
Damian Brosnan is Principal Consultant with Damian Brosnan Acoustics, which specialises in environmental noise, and undertakes projects such as noise impact assessments, predictive modelling, nuisance investigation, and noise management. Damian has a Postgraduate Diploma in Acoustics & Noise Control (Institute of Acoustics, 2009) and an MSc (Distinction) in Applied Acoustics (University of Derby, 2015). He is a member of the Institute of Acoustics (MIOA), and secretary of the Irish IOA branch. He is also a member of Engineers Ireland (MIEI) and a founding member of the Association of Acoustic Consultants of Ireland. Damian has been working in acoustics since 1996, formerly as a Noise Officer with Cork County Council, and as partner with DixonBrosnan Environmental Consultants. To date, he has worked on several hundred noise projects, including a large number of quarry projects. Damian is engaged with continuing professional development through the IOA and Engineers Ireland.

Dr. Charles Mount
Charles Mount is an Archaeologist with more than 30 years' experience of archaeology, cultural heritage and project management. Dr. Mount is a Project Archaeologist with Bord na Móna, where he manages the excavation and post-excavation programme, and the Irish Concrete Federation, where he oversees the archaeological aspects of quarry development. He was formerly Archaeological Officer with the Heritage Council and archaeologist with the Archaeological Survey of Ireland. He is a member of the Institute of Archaeologists of Ireland and the Discovery Programme. Dr. Mount is a graduate of University College Dublin with an M.A, and Ph.D. in Archaeology and he has completed the UCD Diploma course in EIA and SEA Management. He has worked in a variety of archaeological, heritage and management roles within the university, state, semi-state and private sectors. He is license eligible and has directed and participated in archaeological excavations throughout Ireland and Britain. He has managed a wide range of archaeological projects involving specialists drawn from a range of disciplines. He has extensive experience of Environmental Impact Assessment gained over the last 30 years in a wide range of industries in the private and semi-state sectors including extractive, transport, energy, waste, residential and agri-food. He has a research interest in prehistoric archaeology and has published research papers and excavation reports in Irish and international journals, conference proceedings and thematic volumes.

EIAR Structure

An Environmental Impact Assessment (EIA) is required for the extractive industry which fall within category 19 of the Fifth Schedule Part I, category 2(b) of the Fifth Schedule Part II and category 13(a) of the Fifth Schedule Part II of the Planning & Development Regulations 2001 (S.I. 600 of 2001).

Category 2(b) of the Fifth Schedule Part II states:

'*Extraction of stone, gravel, sand and clay, where the area of extraction would be greater than 5 hectares*'.

Category 13(a) of the Fifth Schedule Part II states:
'Any change or extension of development 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 per cent, or*
- *An amount equal to 50 per cent of the appropriate threshold,*

whichever is greater.

The application for further development extends to 15.5ha, which includes the yard area, settlement ponds, areas used for aggregate and silt storage, active extraction areas and future extraction areas. The current and future extraction areas are above the 5ha threshold, so an EIA is required.

The EIAR has been prepared using the grouped format structure as recommended in the EPA's '*Guidelines on the Information to be contained in Environmental Impact Statements*[1], '*Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)*'[2], *'Revised Guidelines on the information to be contained in Environmental Impact Statements'*[3] and '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*'[4]. The latter are draft (dated August 2017) and will be reviewed when new regulations transposing Directive 2014/52/EU[5] are published.

Using the grouped format structure, the EIAR examines each topic as a separate section. Each specialist section refers to the relevant specialist topic using the following general structure:

- The existing / baseline environment.
- Impact assessment of the gravel pit, which addressed the likely significant affects that are likely to occur because of the gravel pit operations.
- Impact mitigation which are being implemented or which will be implemented to avoid, reduce and/or mitigation impacts identified.

The EIAR is submitted in three volumes:

- Volume 1: Non-Technical Summary
- Volume 2: Main Report
- Volume 3: Appendices

The non-technical summary provides an overview of the work presented in the main body of the EIAR. It is a shortened and simplified version of Volume 2 but contains all the key information presented in a non-technical format.

Scoping of the EIAR was developed from the Sixth Schedule of the Planning & Development Regulations 2001, Directive 2014/52/EU and in consultation with the relevant organisations. The main body of the EIAR describes the development, and examines the impact of the development on the following aspects of the environment:

- Population & Human Health
- Biodiversity
- Land
- Soil
- Water
- Air & Climate
- Cultural Heritage
- Material assets
- Landscape
- Interaction of the Foregoing

For each topic, a screening process was undertaken to identify those topics that are important / relevant to the development – refer to Section 1.4. As discussed in Section 1.4, some aspects of the environment were screened out. For each topic discussed, the impacts (direct and indirect) are identified and mitigations are discussed where appropriate. Cumulative impacts associated with nearby developments are also assessed, where appropriate.

1. INTRODUCTION

1.1 Legislative Context

The European Court of Justice (ECJ) decision in July 2008 prohibited application for retention permission for developments requiring EIA, except in exceptional circumstances. Section 23(c) of the Planning & Development (Amendment) Act 2010 provided that the planning authority cannot accept a planning application for retention which would have required an EIA, a determination as to whether EIA was required or an appropriate assessment (AA). While Section 23(c) only came into effect on 31 March 2011, planning authorities were instructed not to accept such applications since October 2008.

The ECJ ruling did however allow for the regularising of developments requiring EIA through the substitute consent process. Section 57 of the Planning & Development (Amendment) Act 2010 makes provision for the substitute consent process. In circumstances where the county council serves notice on a developer requiring it to apply to An Bord Pleanala for substitute consent, it must be accompanied by a rEIS (now rEIAR) and / or a remedial Natura Impact Assessment (rNIS). The substitute consent provisions commenced on 21 September 2011.

A special provision ('sunset provision') was made for quarries with retention, EIA and/or AA issues whereby the operators were required to apply for substitute consent without proving exceptional circumstances. Section 75 of Planning & Development (Amendment) Act 2010 inserts a new section (Section 261A) into the 2000 Act which requires each planning authority to assess the status of each quarry/gravel pit in its functional area with regard to EIA / AA compliance, followed by an assessment of its planning status. These assessments were completed by the local authorities in 2012 and determinations issued to affected quarry operators.

In August 2012, Cork County Council made a determination that DWCL should have carried out EIA for the Ummera gravel pit, but didn't, so was instructed to apply to An Bord Pleanala for substitute consent. The substitute consent application to be accompanied by a remedial EIS (now remedial EIAR). In September 2012, DCWL made an application to An Bord Pleanala for a review of the Council determination. On 24 February 2014 following its review, An Bord Pleanala decided to confirm the Council's determination requiring DCWL to apply for substitute consent including a remedial EIS (rEIAR). This was delayed in the courts for a number of years. In August 2020, DWCL submitted an application for substitute consent to An Bord Pleanala.

The European Union (Environmental Impact Assessment and Habitats) Regulations 2015 (SI No. 301 of 2015) amends the Planning & Development Act, 2000 with the insertion of Section 37L. Section 37L states:

> *(1) Where an application for substitute consent is or was required to be made by the owner or operator of a quarry pursuant to subsection (7), (10) or (12) of section 261A, the owner or operator may apply for permission to further develop that quarry in accordance with this section*.

Applications for further development are to be made to An Bord Pleanala within 6 weeks of the making of the substitute consent application. The particulars of applications being made under Section 37L are set out in the Planning & Development (Amendment) (No. 2) Regulations 2015 (SI No. 310 of 2015). DCWL is making an application to An Bord Pleanala for further development of the Ummera gravel pit / quarry (as a gravel pit / quarry) under the provisions of Section 37L.

1.2 Project Background

Gravel extraction has been ongoing at the Ummera site since the 1940's. This has been confirmed by locals living near the site. The presence of gravels is noted on the Geological Survey of Ireland (GSI) field sheets dating from the 1860's. The 1934 edition of the OSI mapping doesn't indicate the presence of extraction operations, while the 2,500-scale revised edition of 1974 shows extraction operations at the northwest corner of the site. OSI mapping and aerial photography can only confirm that the pit opened between 1934 and 1974. Figure 1-1 shows the site location.

The land comprising Folio CK3263 was owned by Denis McSweeney of Ummera, Macroom and extending to approximately 30ha. The property was in the same folio since 1912. Mr. McSweeney farmed the land. Sometime in the 1940's, gravel extraction commenced at the northern perimeter of the landholding. The pit was operated for a time in the 1950's/1960's by Peter Moynihan.

In 1976 Daniel & Sean Lordan applied for planning permission for '*Opening of Gravel Pit*' nearby and in the same landholding – planning number 375/76 refers. The subject site consisted of one field extending to an area of 3.1ha. Permission was granted, but was not commenced, so lapsed on 07 April 1981; no gravel extraction occurred within the area subject of planning 375/76 within that 5-year period by any operators (i.e. no extraction occurred within the red-line boundary of 375/76). The extent of the 1976 planning application is shown on Figure 1-3.

Murnane & O'Shea Ltd (M&OS) (an affiliate of DCWL) became involved in the site in or around 1978. M&OS leased an area of land, including the existing gravel pit, and continued extraction activities at the site. In 1978, M&OS applied for and secured planning permission for '*Gravel Plant in Existing Pit*' (i.e. a washing plant) – planning number 1365/78 refers. The extent of the 1978 planning and original lease area is shown on Figure 1-3. The washing plant installed with the benefit of that planning permission is that still used at the gravel pit. Furthermore, it is the only washing plant at the site, so intensification cannot be said to have occurred. Fluctuations in production down through the years has been a function of economic activity.

The washing plant and settlement lagoons were installed at the pit in late 1978 / early 1979. The original settlement lagoon is located to the west of the gravel pit and on the opposite side of the road (local road L-3423-20) – between the public road and the Clashavoon Stream. At the request of the South-Western Regional Fisheries Board (SWRFB - now Inland Fisheries Ireland, IFI), settlement lagoons were constructed within the gravel pit in the 1980's. There were concerns that the original lagoon was too close to the stream. While the original lagoon continued to be used, it acted only as a polishing lagoon; it is overgrown and no longer cleaned out.

Between 1978 and 2003, DCWL renewed its lease, naturally expanding the lease area to the east and south as extraction progressed. In 1995/96, the washing plant was relocated within the gravel pit – from the northwest corner to its current location, along with enlargement of the settlement lagoons. The entrance into the gravel pit was also relocated from the northwest corner to its current location around that time. In 2003, DCWL purchased approximately 20.22ha of Folio CK3263 containing the gravel pit and land into which the gravel pit would be expected to be developed.

In July 2003 Cork County Council issued a warning letter to M&OS pursuant to Section 152 of the Planning & Development Act 2000 alleging unauthorised intensification of quarrying activities at the Ummera pit. Fehily Timoney & Co (FTC) responded to the allegation of unauthorised development, refuting same. In January 2004, Cork County Council sent further correspondence claiming a 15-fold increase in the quarrying area since 1978 and a 25-fold increase in extraction rate. Following a meeting with Cork County Council in February 2004, FTC submitted a comprehensive rebuttal of the Council's allegations on 15 March 2004. The Council didn't respond to FTC's submission. DCWL continues to operate a gravel pit at the site.

1.2.1 Section 261 Application

In 2004, DCWL applied to Cork County Council to have the gravel pit registered under Section 261 of the Planning & Development Act 2000 – registration number QR01 refers. The workable area identified in the Section 261 application was the landownership bounded by the public roads – an area of 17ha within a landownership of approximately 20.22ha. Refer to Figure 1-2 showing the Section 261 application map.

Cork County Council published a notice in the Irish Examiner on 18 March 2005 indicting its intention with regard to the quarry registration as follows:

- *To modify and add to conditions relating to the area covered by the permission granted under Ref No. 76/375, and*
- *To require a planning application and submission of an Environmental Impact Statement on the balance of the total quarry area*.

DCWL was notified by the Council in correspondence dated 14 September 2005, indicating it would proceed with its intention as advertised on 18 March and as quoted above. DCWL made a submission to the Council dated 24 October 2005 detailing a number of issues with the Council's intended approach to the quarry registration. Following that submission, Cork County Council changed its intended quarry registration approach. In correspondence dated 28 October 2005, the Council indicted that it:

> '*now intends to modify and add to the conditions that were imposed on the QR01 quarry under planning permission ref no. 76/375*'. The rational for this change in approach was '*that there are a significant number of quarries for which registration has been sought and where planning permission has been granted on only part of the active quarry site. We now consider that the appropriate course of action in such cases is to modify and add to condition relating to any relevant previous planning permission*'.

While DWCL didn't agree with the specifics of the approach, it was prepared to operate the gravel pit under imposed planning conditions and environmental controls. It is noted that the permission (76/375) on which the Council intended to use as a vehicle to impose planning conditions had lapsed without being commenced and so should not have been used. DCWL submitted the further information requested by the Council in its 28 October 2005 correspondence.

On 07 September 2006, Cork County Council issued a notice under Section 261 subsection 6 of the Planning & Development Act 2000 of its decision to modify and add conditions (64 No.) imposed under planning permission Reg No 375/76. A number of conditions were appealed to An Bord Pleanala. In June 2007, An Bord Pleanala amended and removed a number of conditions. From June 2007, DCWL operated the gravel pit having regard to conditions imposed on its operation.

1.2.2 Section 261A Process

As outlined in Section 1.1 above, Cork County Council was required (under Section 75 of Planning & Development (Amendment) Act 2010) to assess the status of quarries in its functional area with respect to EIA / AA compliance. On 23 August 2012, Cork County Council issued its decision for Ummera under Section 261A(3) on foot of a determination under Section 261A(2). The determination was that:

> *'Quarry development was undertaken post 1st February 1990 that would, having regard to the Environmental Impact Assessment Directive, have required an environmental impact assessment but that such an assessment was not carried out or made'.*

The reason for the determination was given as:

'The quarry development expanded by 3.84 hectares post 1995….This expansion results in the quarry being greater than 5ha in surface area and therefore results in an increase in size greater than 25% of the quarry area and 50% of the appropriate 5ha threshold. Accordingly, EIA is required under Class 13 of Part 2, Schedule 5 of the Planning & Development Regulations 2001, as amended'.

In September 2012, DCWL made an application to An Bord Pleanala for a review of the Council determination. An Bord Pleanala was requested to quash the Determination and Decision of Cork County Council and to conclude that, without a basis for a determination under Section 261A(2), that No Further Action is the appropriate result of the Section 261A review process with respect to the Ummera site.

On 24 February 2014 following its review, An Bord Pleanala decided to confirm the Council's determination requiring DCWL to apply for substitute consent including a remedial EIS. DWCL sought, and was granted, leave from the high court to apply for judicial review of the An Bord Pleanala's decision in April 2014, with Cork County Council named as a notice party. The case was adjourned a number of times pending the outcome of the 'the McGrath case' as to the constitutionality of Section 261A of the Planning & Development Act 2000 – McGrath Limestone Works v An Bord Pleanala, Ireland and the AG. In March 2020, the case was adjourned generally due to HSE covid 19 restrictions

DCWL submitted a substitute consent application with rEIAR in August 2020. The rEIAR was prepared in accordance with Section 177F of the Planning & Development (Amendment) Act 2010.

As noted in Section 1.1, Section 37L of the of the Planning & Development (Amendment) (No. 2) Regulations 2015 (SI No. 310 of 2015) provides for applications to be made by operators to An Bord Pleanala for further development of gravel pits/quarries within 6 weeks of making a substitute consent application.

1.3 Pre-Submission Consultation

In the course of the preparation of the EIAR, KGEC and the specialist sub-consultants contacted a number of organisations and individuals. These are referred to in each section of the EIAR as appropriate. The organisations contacted are summarised in Table 1-1.

Table 1-1: List of Consultees

Organisation	Response Received
Geological Survey of Ireland, Department of Communications, Climate Action & Environment	Yes
Transport Infrastructure Ireland	Yes
Department of Transport, Tourism & Sport	Yes
Air Quality Section, Department of Communications, Climate Action and Environment	No
Office of Public Works	No
Failte Ireland	No
Cork County Council – Macroom Area Engineer's Office	No
Department of Culture, Heritage and the Gaeltacht - DAU	Yes
Environmental Protection Agency	Yes
Inland Fisheries Ireland	Yes

1.4 Scoping

The scoping process determines the areas or aspects, which are important during the environmental assessment of the development. It was used to eliminate those aspects of the environment that are less important. The level of work carried out for each topic reflects the potential impact on that aspect of the environment that may have occurred during the lifetime of the gravel pit, as identified during the scoping process.

An initial scoping of possible impacts of the gravel pit was carried out in accordance with Article 3 of Directive 2011/92/EU as amended by Article 3(1) of Directive 2014/52/EU. The Directive lists 10 areas, which should be assessed:

- Population & Human Health
- Biodiversity
- Land
- Soil
- Water
- Air & Climate
- Cultural Heritage
- Material assets
- Landscape
- Interaction of the Foregoing

The scoping process was based on:

- Examination of documentation relating to the S261 application process for the Ummera gravel pit and other gravel pits / quarries in similar circumstances.
- Examination of documentation relating to the S261A determination and An Bord Pleanala's review.
- Examination of documentation relating to the substitute consent application for the Ummera gravel pit.
- The operational experience gained in the past 40 years at Ummera gravel pit.
- Review of available company files and correspondence relating to the gravel pit.
- Experience of the consultants in preparing environmental impact assessments for gravel pits / quarries.

The areas identified during the scoping process as being the most significant issues were noise, traffic, dust, groundwater and surface water. The emphases placed on potential impacts following the scoping process are described below:

Population & Human Health

Aspects of population and human health include health & safety, socioeconomics, tourism, noise and air quality. The gravel pit is located on private lands with restricted access. It is and has been operated in accordance with relevant health and safety regulations. It provides employment for one operative, with additional employment provided to ancillary supports such as HGV drivers, mechanics, suppliers etc. As such, no significant impacts affecting human beings in the surrounding environment in terms of health & safety, socioeconomics and tourism are envisaged. These issues are addressed in Chapter 3. Factors that are considered significant in the context of the gravel pit in terms of population and human health include noise and air quality.

Gravel pit workings can increase background noise levels. For nearby residents, this can be a concern. This topic is addressed in Chapter 5. A noise survey was carried out to assess noise impacts from the extraction and processing activities, with measurements recorded with and without the processing plant in operation. The current operations will be the same for the further development of the gravel pit, with the working face moving to the south and southwest.

The operations at the gravel pit has given rise to fugitive dust emissions in the past. This is documented in correspondence submitted to the S261 application. A dust suppression system was installed to dampen down dust in periods of dry windy weather. This issue is addressed in Chapter 6.

Biodiversity

The gravel pit is located in a rural setting dominated by dairy and beef farming. The site of the Ummera gravel pit was formerly grazing land. The gravel pit is not connected with any designated site. The development of the gravel pit has resulted in a greater range of habitats then would otherwise have been present at Ummera. This includes nesting habitats for Sand martin. Biodiversity is discussed in Chapter 10.

Land

The landholding extends to 20.22ha, most of which is directly used for extraction-related activities – active extraction area, processing area, open storage of aggregate, settlement lagoons, screening berms etc. A small area is still used for agriculture, mainly silage cutting, and an area with old farm buildings. The proposed further development will deepen the gravel pit, but also extend into agricultural lands. The surrounding lands are dominated by dairy and beef farming. The after-use proposals for Ummera gravel pit are to restore the site back to mainly agricultural use, with some aspects of the gravel pit maintained for biodiversity. This is addressed in Landscape & Visual Impact. Land use is therefore not considered under a separate chapter heading.

Soils

Geology and hydrogeology are important considerations for the Ummera gravel pit. The overburden deposits are a natural non-renewable resource. While the gravel deposit is not classified as an aquifer, groundwater is encountered as springs. The surrounding area is not serviced by mains water, so private wells are used for drinking water supply – both domestic and agricultural supplies. Groundwater is therefore included in this chapter, but with cross reference to surface water where appropriate. These are discussed in Chapter 8.

Water

The gravel pit is in the catchment of the Sullane River, with the Clashavoon Stream forming the western and northern landholding boundary. The Clashavoon Stream is used to abstract water for use at the gravel pit. The Clashavoon Stream and Laney River has good to excellent water quality, with gravel beds that are suitable for salmonid spawning. Washing of gravel has been carried out at the gravel pit since installation of the washing plant in 1978/79. A number of correspondences are on file from the SWRFB (now IFI) relating to concerns on the settlement lagoons and storage of silt. It is also raised in the An Bord Pleanala inspector's report relating to the appeal of the Council's S261A determination. For these reasons, hydrology and surface water are important factors in the assessment and in particular the management of surface water and wash water at the site. This is discussed in Chapter 7.

Air and Climate

Activities at the gravel pit could result in dust emissions from the site, which could affect air quality. Fugitive dust emissions are influenced by local climatic conditions; dry windy weather can exasperate dust emissions, while wet weather will minimise emissions. Good site management can further mitigate against fugitive dust emissions. This issue is addressed in Chapter 6. It is not considered that Ummera gravel pit will have any impact on climate change. If climate change predictions of increased rainfall extremes occur, the runoff from the site will increase. This is addressed in Chapter 7 in the context of the management of water.

Material Assets

Material assets include built services, roads & traffic and waste management. Roads & traffic are considered the primary aspect of interest for the gravel pit. Waste management isn't a significant aspect but is addressed in Chapter 2 – Project Description.

The immediate area of the gravel pit is serviced by undivided local roads. Gravel pits give rise to increased local HGV traffic. The volume of HVG traffic to/from Ummera gravel pit is directly related to the annual extraction rates. Typically, there has been approximately 50,000 tonnes/annum of aggregate produced at the pit. This results in approximately 10 loads per day on average. Most of the aggregate produced has been taken to Bredagh Cross, using local road L-3423-20/0 to access the regional and national road network. Roads & Traffic are addressed in Chapter 4.

Landscape and Visual Impact

Extraction operations at Ummera have been established for over half a century. The operations in their current scale are established since the late 1970's. The main operations are well screened from the nearby local roads and nearby dwellings. There is mature tree growth along the northern, western and south-western perimeters. Screening berms were established around 2005 along the eastern perimeter. Intermittent screening berms are used at the margin of the extraction area for further visual screening. Landscape and visual impact are discussed in Chapter 11.

Cultural Heritage

Disturbance of the ground during topsoil / subsoil stripping and gravel excavations can have an impact on archaeological features – damage to known monuments/features and uncovering of previously unknown archaeology. There are two recorded monuments within the landholding – a fulacht fiadh and a gallan stone. Both are avoided in the design of the gravel pit for further development. Dr. Charles Mount prepared the archaeological assessment, which is included as Chapter 9.

Table 1-2 shows the organisation of the topics within the EIAR. It is noted that there are several issues cutting across a few prescribed environmental factors; these are cross referenced where appropriate and discussed in Chapter 12 – Interactions of the Foregoing.

Table 1-2: Organisation of Topics within EIAR

Prescribed Environmental Factor	rEIAR Chapter Heading	Chapter Number	Topics Addressed
Population & Human Health	Population & Human Health	3	– Demographics – Health & Safety – Socioeconomics – Tourism
	Noise & Vibration	5	– Pit Noise – Cross reference to health
Biodiversity	Biodiversity	10	– Flora, fauna, aquatic ecology
Land	---	---	Land use is addressed in several other chapters including landscape.
Soil	Soils, Geology & Hydrogeology	8	– Overburden – Bedrock – Hydrogeology
Water	Surface Water & Hydrology	7	– Water Quality – Water Use – Runoff Volumes & Treatment Capacity – Flooding
Air & Climate	Air, Climate & Climate Change	6	– Air Quality – Local Climatic Conditions – Climate Change
Material Assets	Material Assets	4	– Roads & Traffic
Cultural Heritage	Architecture, Archaeology & Cultural Heritage	9	– Archaeology – Cultural Heritage – Architecture
Landscape	Landscape & Visual Assessment	11	– Landscape Context – Landscape Character – Views & Prospects

1.5 Contributors

The EIAR was co-ordinated by Keohane Geological & Environmental Consultancy. Specialist sub-consultants employed with reference to specific portions of the study are summarised in Table 1-3.

Table 1-3: EIAR Contributors

Company Name	Topic Addressed
KGEC	Overall EIAR Coordinator Geology, Hydrogeology, Hydrology, Traffic, Landscape
KGEC	Planning Drawings
Atkins	Biodiversity
Charles Mount	Archaeological Impact Assessment
Dixon Brosnan	Noise & Vibration

1.6 Format of EIAR

An EIA is required for the extractive industry which fall within category 19 of the Fifth Schedule Part I, category 2(b) of the Fifth Schedule Part II and category 13(a) of the Fifth Schedule Part II of the Planning & Development Regulations 2001 (S.I. 600 of 2001).

Category 2(b) of the Fifth Schedule Part II states:

> '*Extraction of stone, gravel, sand and clay, where the area of extraction would be greater than 5 hectares*'.

Category 13(a) of the Fifth Schedule Part II states:

> *'Any change or extension of development 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 per cent, or*
> - *An amount equal to 50 per cent of the appropriate threshold,*
>
> *whichever is greater.*

Annex I and Annex II of Directive 2011/52/EU (as amended by Directive 2014/92/EU) lists projects and activities that require assessment. Annex II refers to quarries and extensions but doesn't give thresholds – these are to be set by the Member States. Directive 2014/92/EU has not yet been transposed, so the limits provided in S.I. 600 of 2001 are used.

The proposed further development area extends to an area greater than 5ha, so an EIA is required in accordance with Category 2(b) of the fifth Schedule Part II.

The EIAR was prepared having regard to guidelines issued by a number of Government and Industry Agencies, including:

- *Guidelines on the Information to be Contained in Environmental Impact Statements*[1]*.*
- *Advice notes on Current Practice (in the preparation of Environmental Impact Statements)*[2]*.*
- *Revised Guidelines on the information to be contained in Environmental Impact Statements*[3]*.*
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*[4]*.*
- *'Quarries and Ancillary Activities – Guidelines for Planning Authorities', DofEHLG, April 2004*[6]*.*
- *'Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-schedule Minerals)', EPA 2006*[7]*.*

- *'Integrated Pollution Control Licensing, BATNEEC Guidance Note for the Extraction of Minerals', (EPA, 1997)[8].*
- *'Environmental Code', Irish Concrete Federation, October 2005[9].*

The BATNEEC Guidance Notes for the Extraction of Minerals is used only as a reference document. The activity in question is not required to have an IPC licence (now IPPC). However, where appropriate, some of the principles outlined in that document are adopted for the control of emissions from the gravel pit.

The EIAR has been prepared using the grouped format structure as recommended in the EPA's 'Guidelines on the Information to be contained in Environmental Impact Statements, 'Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)', 'Revised Guidelines on the information to be contained in Environmental Impact Statements' and 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'. The latter are draft (dated August 2017) and will be reviewed when new regulations transposing Directive 2014/52/EU[5] are published.

Using the grouped format structure, the EIAR examines each topic as a separate section. Each specialist section refers to the relevant specialist topic using the following general structure:

- The existing / baseline environment.
- Impact assessment of the further development of the gravel pit, which addressed the significant affects that are likely to occur as a result of the gravel pit operations.
- Impact mitigation which is being or will be implemented to avoid, reduce and/or mitigation impacts.

The EIAR is submitted in three volumes:

- Volume 1: Non-Technical Summary
- Volume 2: Main Report
- Volume 3: Appendices

The non-technical summary provides an overview of the work presented in the main body of the EIAR. It is a shortened and simplified version of Volume 2 but contains all the key information presented in a non-technical format.

Scoping of the EIAR was developed from the Sixth Schedule of the Planning & Development Regulations 2001, Directive 2014/52/EU and in consultation with the relevant organisations. The main body of the EIAR describes the development and examines its impacts on the aspects of the environment as discussed in Section 1.4.

1.6.1 Technical Difficulties

There were no technical difficulties encountered during the environmental assessment conducted for the proposed further development of Ummera gravel pit.

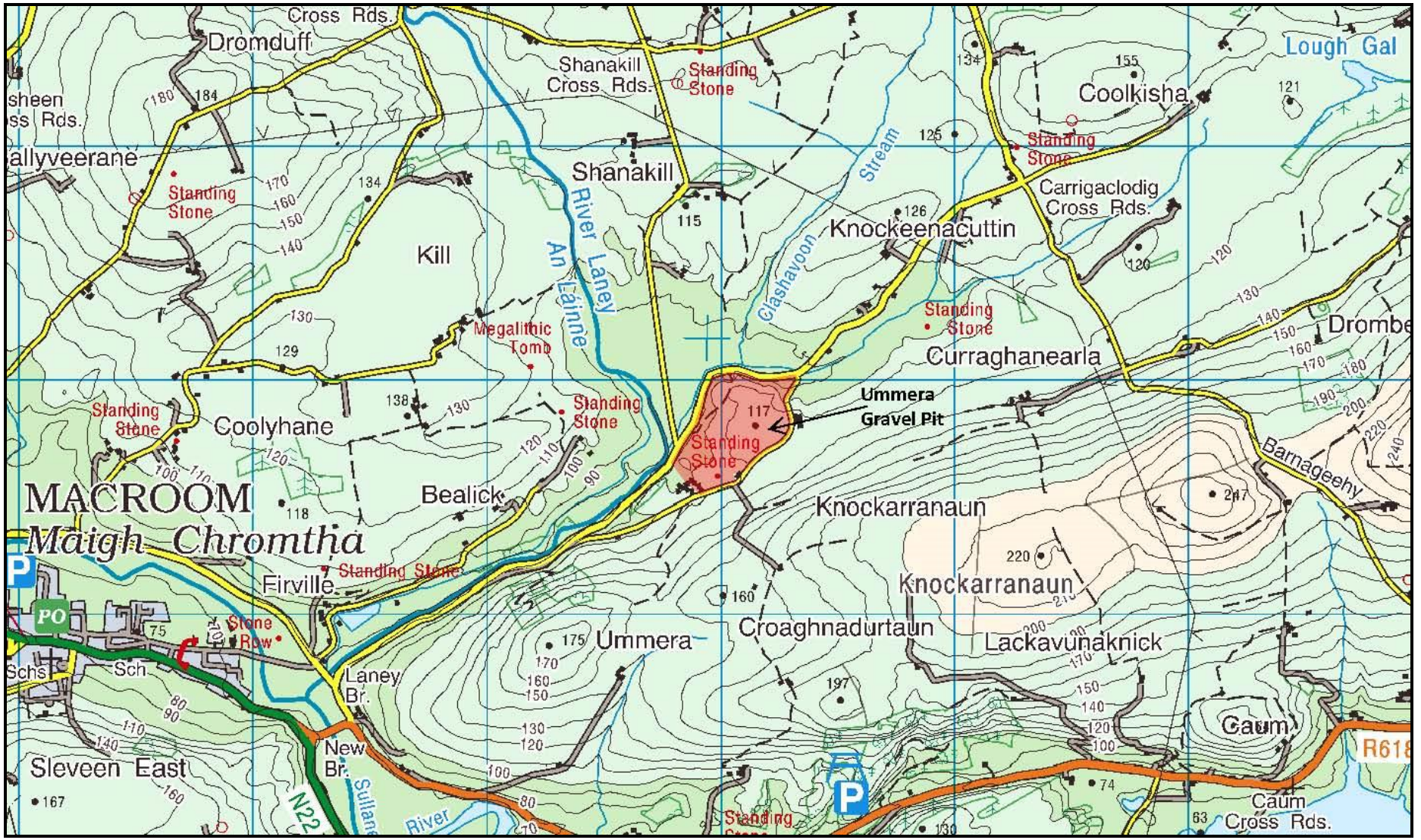


Figure 1-1: Site Location Map

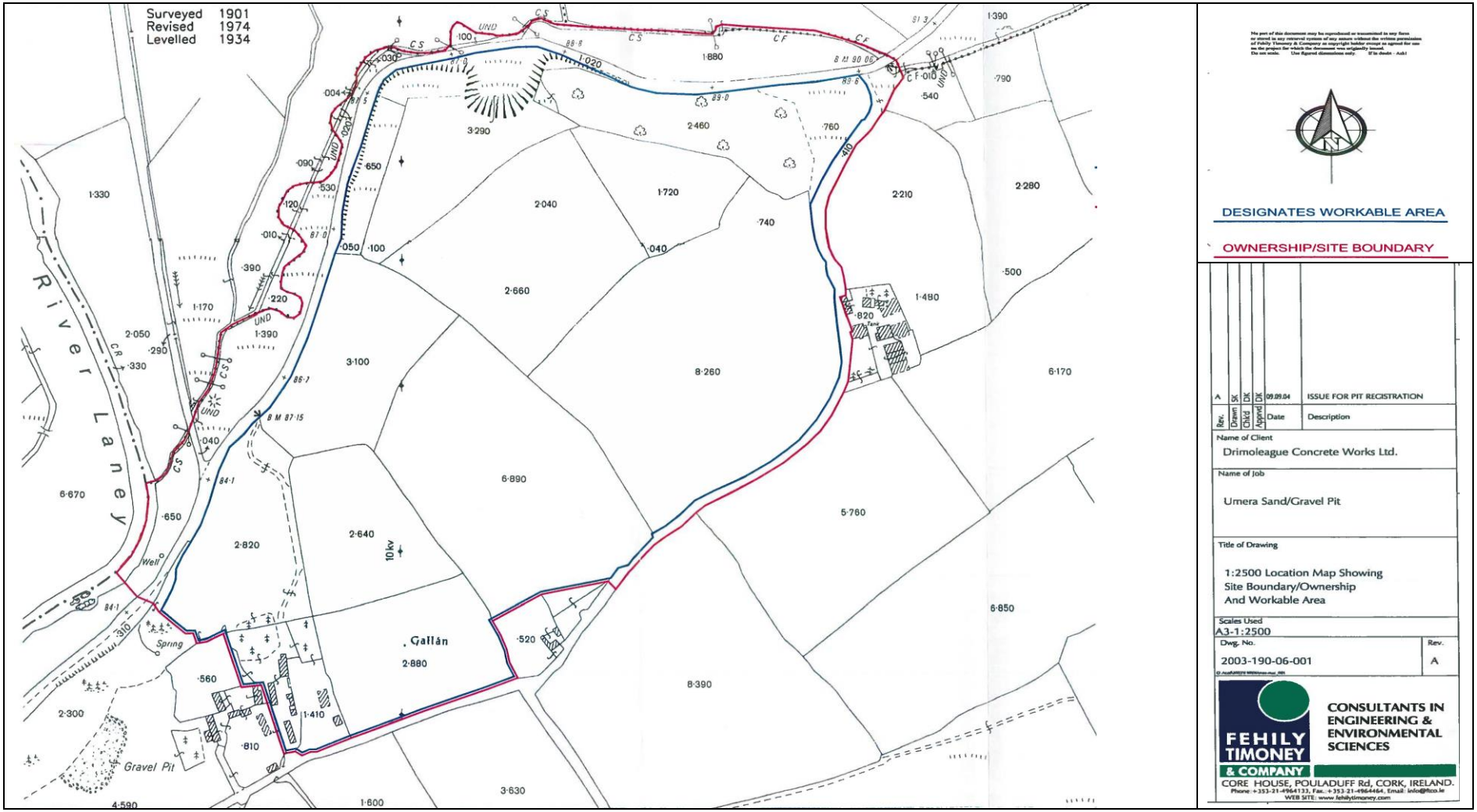


Figure 1-2: Section 261 Application Map

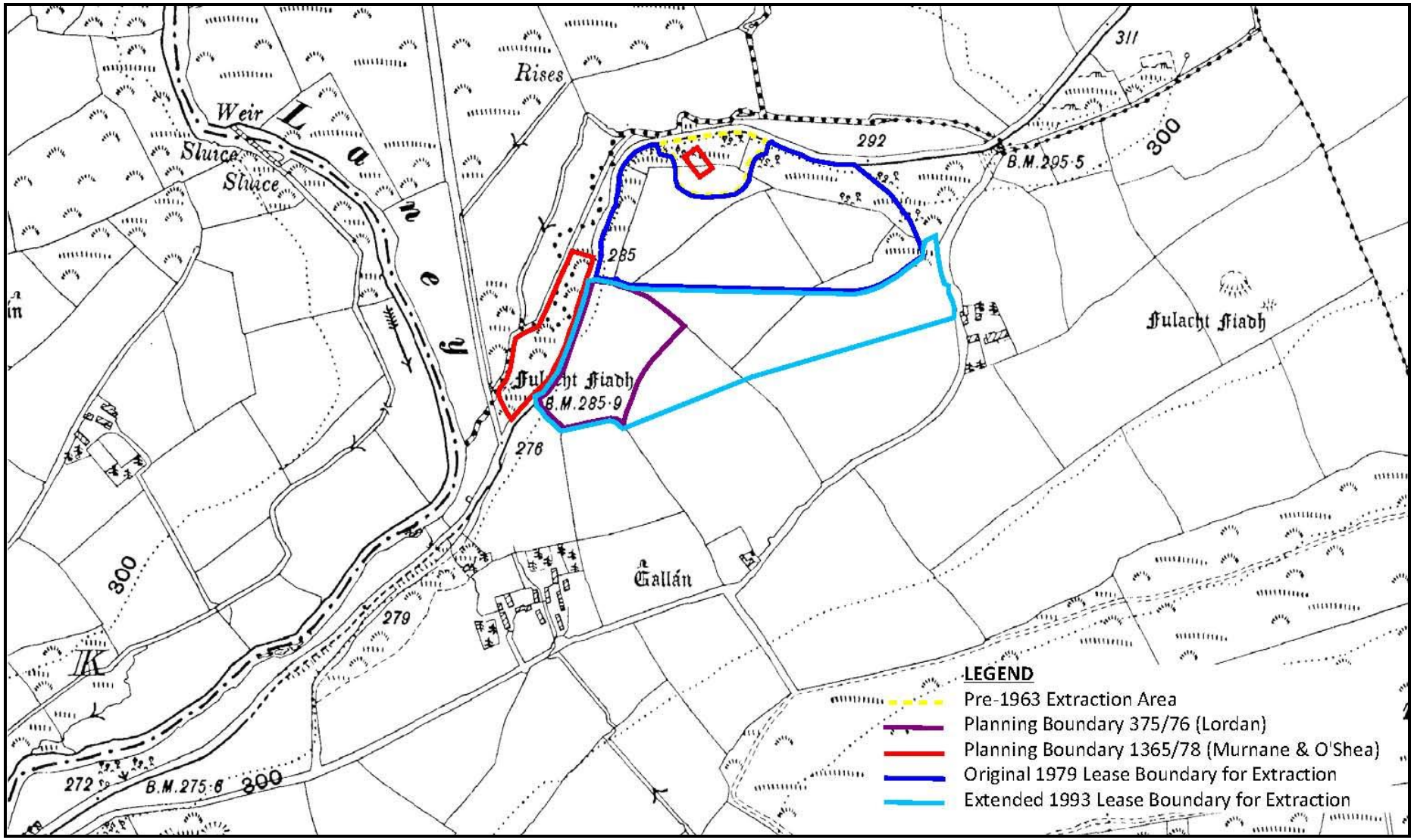


Figure 1-3: Historic Planning & Lease Boundaries

2. DESCRIPTION OF DEVELOPMENT

2.1 Site Setting

The existing gravel pit is in a rural setting in the townland of Ummera, approximately 2.5km to the northeast of Macroom. The site location is shown on Figure 1-1. The gravel pit is located in a landholding of approximately 20.22ha, of which 17ha was included for registration under Section 261 – refer to Figure 1-2. This 17ha of land is not interrupted by any natural or man-made boundaries. The remaining lands in the folio comprise public roads or is separated from the 17ha by public roads. Areas within the 17ha not worked are used for grazing and host the old farmhouse and farm buildings. Part of the landholding is located between the public road and the Clashavoon Stream; the original settlement pond for the gravel pit is located in this area. The surrounding land use is predominantly grazing.

The site is accessed from the National Primary Route N22 via regional road R618, local road L-3423-0 and local road L-3423-20. The pit entrance is from local road L-3423-20.

The site varies in elevation between approximately 85mOD and 115mOD. The site entrance is at an elevation of approximately 85mOD, rises to the east to approximately 115mOD. The floor of the gravel pit is at an elevation of approximately 91mOD.

2.1.1 Settlement Pattern

The settlement pattern in the area is one of scattered farmhouses and once-off housing. There are 14 dwellings within 500m of the land ownership boundary offset. These are listed in Table 2-1 and are shown on Figure 2-1. As shown in Table 2-1:

- There are 6 houses within 500m of the further development boundary.
- Two houses, H1 and H2 are located nearest the further development boundary at approximately 15m and 40m respectively.

Table 2-1: Houses within 500m of Land Ownership Boundary

House No.	Distance from Landowner Boundary (m)	Distance from S37L Planning Boundary (m)	Year House Constructed	Comment
H1	5	15	pre-1930's	---
H2	35	40	pre-1913	---
H3	45	50	pre-1842	---
H4	365	370	pre-1974	---
H5	500	600	pre-1995	---
H6	490	780	pre-1913	---
H7	470	555	2003-2004	03/5671
H8	475	560	1987-1988	87/439
H9	455	540	1974-1975	73/3311
H10	100	230	2002-2003	02/3366
H11	155	280	1981-1982	81/1880
H12	395	520	pre-1934	---
H13	480	610	1990-1991	90/1105
H14	500	645	1984-1985	84/2447

2.2 Description of Existing Pit

The activities at Ummera gravel pit consist of extraction of sand & gravel in an area currently extending to approximately 3.4ha, with yard area, settlement ponds and stockpile areas extending to approximately 7.1ha.

Breakdown of Gravel Pit Areas	
Total land holding (folio CK114765F)	= 20.22ha
Section 261 application area	= 17ha
Substitute Consent area	= 10.5ha
Further Development area	= 15.5ha

The further development area includes the area covered by the substitute consent application, the original settlement ponds and areas along the eastern, southern and southwestern perimeter of the landholding. This approximately 2ha area is largely grazing land or occupied by temporary screening berms. The area occupied by the old farm buildings (at the southwestern corner of the landholding and the southernmost part of the grazing land (where the gallan stone is located) are not included in the further development area.

2.2.1 Extraction Operations

The gravel is won using a track-mounted excavator which selects suitable material for processing; silty material is set to one side for later use in restoration. The track-mounted excavator is brought to site periodically to stockpile material near the working face prior to washing. A front-end loader is used to draw material from the working face to the washing plant. Material is tipped into a hopper with a coarse screen that rejects stones greater than 60mm in diameter; smaller material drops onto the conveyor which takes it to the washing plant. Various aggregate sizes are screened and directed into concrete bunkers below the washing plant. The wash water is directed into the settlement ponds carrying silts and fines. This washing plant has been used at the gravel pit since the late 1970's and has been at its current location since the late 1980's. Blasting is not carried out at the pit.

The processes and activities at the gravel pit are summarised as follows:

1. Topsoil and overburden are stripped from the area from which gravel is to be extracted. Stripping is carried out using an excavator. A dumper is used to draw soil around the site if necessary. The topsoil and overburden are used to provide temporary screening around the working area.
2. The deposit is variable in content (variable grain size), so is worked in different areas to achieve the desired blend of aggregate sizes to suit demand. Silt / clay layers occur in the deposit and these are set aside using an excavator.
3. Gravel is loaded into the washing plant using the front-end loader. The washing plant screens the aggregate into a number of size fractions, including sand, 6 to 10mm stone, 10 to 20mm stone, 20 to 50mm stone and 50mm^{+} stone.
4. Silts and fines are carried to the settlement ponds by the wash water. The ponds are cleaned periodically, and the silt is stored to the west and east of the of the ponds where it dries out. The silt will be used for future restoration. Occasionally, there is demand for this silt for use as bedding sand.

The site layout, showing the proposed further development area, is provided as Figure 2-2. The main elements of the gravel pit are described in the subsection below.

2.3 Description of Proposed Development

It is proposed to increase the footprint of the existing gravel pit by approximately 2ha with extension to the east, south and southwest. The extent of the extension has been informed by site constraints including the standing stone, the ecology around the old farm buildings and offset from adjoining properties. Of the 2ha of 'new' area, approximately 1.5ha will be extraction footprint and the remainder taken up with berms.

The further development of the gravel pit has been designed having regard to Sand and Gravel Production[10], the QNJAC Quarry Design[11] and A Quarry Design Handbook[12]. Gravel deposits remain in the existing void and will continue to be worked. The washing plant and existing infrastructure will continue to be used. A number of improvements to the site infrastructure are also proposed.

The proposed development is summarised as follows:

- Total area of further development extending to 15.5ha.
- Extension of existing gravel pit to the south, east and southwest into an area of approximately 2ha.
- Continued working of the existing gravel pit.
- Inclusion of the original settlement pond (between the public road and Clashavoon Stream).
- Continued use of the existing site infrastructure including, access road, washing plant, settlement ponds, site offices, open storage of aggregates and all ancillary infrastructure.
- Construction of a bunded fuel / oil storage shed and concrete refuelling pad.
- Paving of the site access road from the public road to the site office.
- Construction of earthen screening berms and native tree planting.

The current gravel pit activities will continue for the further development. Activities at the further development are discussed below. The proposed site layout is shown on Figure 2-2.

2.3.1 Site Plant

The plant used on site include:

- A stationary washing plant powered by an electrical motor – see Plate 2-1
- A Volvo front-end loader used for loading raw material into the washing plant and loading trucks.
- A water pump powered by electrical motor located adjacent to the Clashavoon Stream. The pump has a capacity of 74m^3/hr at a head of 15m – the height between the intake and the wash plant. This pump is used to top up the water recirculation system.
- A second pump powered by electrical motor located in the western pond, adjacent to the site office, to recirculate wash water. It has capacity of 135m^3/hr.
- Track-mounted excavators are hired-in when needed to clean out the settlement ponds, segregate materials at the working face and strip topsoil. Dumpers are also hired-in when needed for this work.

Plate 2-1: View of Washing Plant from the East

2.3.2 Settlement Ponds

The recycling of wash water has seen several changes since the washing plant was installed in 1978 / 79. The current arrangements are as follows:

- The settlement ponds (4 No.) are located to the north of the washing plant through which water is circulated. Raised gravel platforms were installed to permit access to the ponds by excavators during cleaning. These divide the ponds originally installed in 1980's and 1990's and seen on the aerial photography – see Figure 2-2. The water circulation through the ponds is as follows:
    - Water is pumped from the western pond into the washing plant. This is topped up with water abstracted from the Clashavoon Stream, if needed.
    - The used water is discharged to the eastern pond and flows from pond to pond, back to the western pond to the pump intake. The ponds are connected by 300mm ϕ HDPE pipes. These are set at levels so that water flows from east to west through the ponds with water decanted from the surface.
- The original pond is located between the public road and the Clashavoon Stream. It is no longer used. The water abstraction point is located at the northern end of this pond. There is a small pump house at this location.
- There is an overflow from the western pond which decants water from the pond when water levels rise due to rainwater ingress into the settlement ponds. This overflow directs water to a settlement pond adjacent to the access road. It also takes runoff from the western side of the yard area. This pond discharges clean water back to the roadside drain. As the settlement ponds collect runoff from the eastern side of the yard area and the area east of the washing plant, there is surplus water in the settlement ponds in periods of heavy rainfall. This pond now takes this excess water.

The settlement ponds in the wash water recirculation system are approximately 3m deep with surface areas (from east to west) of 980m^2, 1,200m^2, 1,000m^2 and 1,750m^2 (total area = 4,930m^2; total volume = 14,790m^3). The pump capacity is 135m^3/hr, so in a working day, approximately 800m^3 of water is used for washing. The retention time in the ponds is therefore approximately 18.5 days (which increases to 21 days when weekends are factored), which is sufficient to settle silt and clay particles. The travel path through the ponds is approximately 250m. This capacity will decrease as silt builds up over time. Ponds are cleaned approximately once per year. Plate 2-2 shows the settlement ponds.

Plate 2-2: Settlement Ponds (Eastern Pond Filling; View from East)

The overflow pond adjacent to the access road is 60m long and approximately 14m wide, with a surface area of approximately 580m^2. The pond is 1m deep (to the invert of the discharge pipe), giving a capacity of approximately 580m^3. Plate 2-3 shows the overflow settlement pond.

Plate 2-3: Overflow Settlement Pond (Looking SW; Inlet Structure)

To date, no discharge from the overflow pond has been observed.

2.3.3 Power Supply

The power supply to the site is mains ESB supply. The mains supply is taken from an overhead 10kV powerline that crosses over the western side of the pit. The supply enters the pit from a pole-mounted transformer at the north-western corner of the pit; located adjacent to the original location of the washing plant. An underground cable goes to the electrical panel located adjacent to the site office. There is no back-up generator at the pit. This has been the power supply arrangement to the gravel pit since the late 1970's.

2.3.4 Fuel Storage

Refuelling of site plant takes place in the yard area of the gravel pit. Fuel is stored in a self-bunded plastic tank with 1,300 litre capacity. Plastic drums (20 litres typical) of oil are stored in the body of a small truck used as a storage shed. As noted, a fuel storage shed and concrete refuelling pad is proposed as part of the further development.

2.3.5 Water Usage

Water is used at the gravel pit for washing gravel, as described in Section 2.3.2 – rainfall runoff is captured and topped up from the Clashavoon Stream, if needed.

Water has also been used for dust suppression; a sprinkler system was installed along the site access road, around the floor of the pit and around the working face of the pit in the late 1990's. Water used for dust suppressed had been sourced from the Clashavoon Stream and stored in a 26m^3 tanker. In recent years, there has not been a requirement for dust suppression and the infrastructure has fallen into disrepair. It can be put back into use if required.

There are no groundwater supply wells at the gravel pit.

Potable water is brought to site by the site manager for personal use.

2.3.6 Welfare Facilities

The site office and welfare facilities are located in the yard area of the gravel pit, adjacent to the site office. Foul effluent is treated in the on-site septic tank and percolation area. This will be replaced by a sealed 2.2m^3 underground tank.

2.3.7 Working Hours

Condition No.3 of quarry registration QR01 gives the working hours as:

- Weekdays – 07:00 to 19:00
- Saturdays – 07:00 to 14:00
- No operations on Sunday or Public Holidays

In practice however operations at the pit do not generally commence until 09:00. The closing time is 18:00, with earlier closing times in winter months. The pit generally closes at 13:00 on Saturdays. The longer hours are required for flexibility. The pit will not open on Sundays or Public Holidays. These operating hours are largely in accordance with the DEHLG Quarries & Ancillary Activities – Guidelines for Planning Authorities, April 2004.

2.3.8 Security

The pit entrance gate is locked outside working hours. This is a 2.3m high steel gate. The perimeter of the landholding is fenced with a 1.7m-high timber post and wire security fence. Warning signs are affixed to the fence at intervals warning of the presence of the active gravel pit. The settlement lagoons have been fenced off from the yard area. This fence was damaged during recent rearrangement of the pond layout and has been replaced.

2.3.9 Lighting

There is no flood lighting at the gravel pit. There are lights on the front-end loader. Generally, however, the pit isn't worked after nightfall.

2.3.10 Waste Management

Waste generated at the gravel, and its recycling, recovery or disposal, includes:

- Stripped topsoil / subsoil will be reused on site for berm construction and in final restoration of the gravel pit. It is not envisaged that any soil will be taken off site for disposal.
- Silt, which is the waste material from the washing process, will be stored on site for reuse in the restoration of the site.
- Domestic type waste generated by site workers is taken off-site by the workers each day.
- Scrap metal will be stored on site and periodically collected by a licensed contractor for recycling.
- Foul effluent from the welfare facilities is treated on site in a septic tank. This will be replaced with a sealed 2.2m^3 underground tank.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for re-cycling by a licensed contractor.

2.3.11 Proposed New Infrastructure

The following infrastructure is proposed to be installed at the gravel pit:

- Concrete refuelling pad.
- Fuel storage shed.
- Sealed wastewater collection tank to replace the existing septic tank.

A concrete refuelled pad consisting of a reinforced 6m x 6m bermed concrete slab with falls to a grit trap and oil trap. A fuel storage shed will be located adjacent in which diesel will be stored as well as oils. Plate 2-4 shows the proposed infrastructure. It is also proposed to pave the access road into the pit (from the public road to the site office).

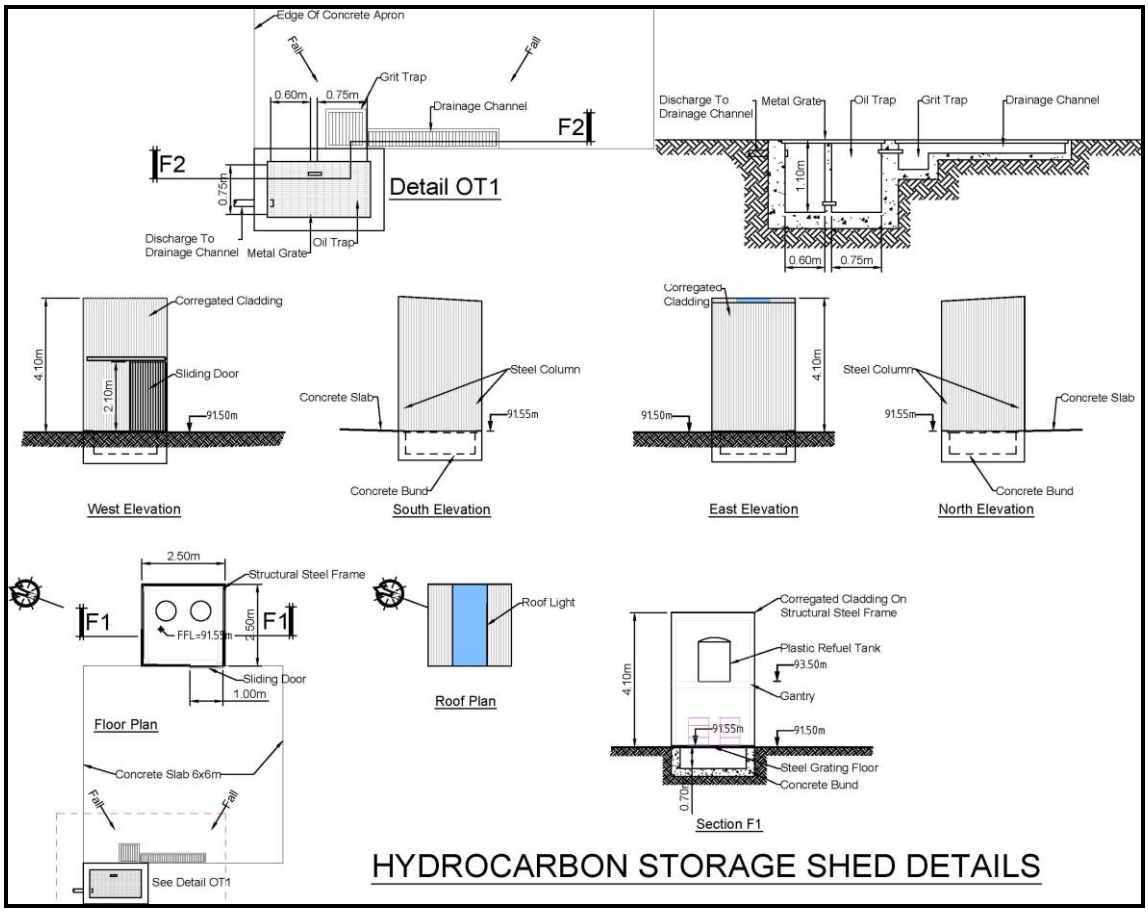


Plate 2-4: Proposed Fuel Storage Shed & Refuelling Pad

2.4 Environmental Monitoring

DCWL has an Environmental Management System (EMS) in place for the operation of the Ummera gravel pit.

Environmental monitoring at the pit has been conducted intermittently in the past. Going forward, monitoring will be conducted during the lifetime of the operations to assess the effects on the environment so that operational changes and improvements can be made where appropriate. The proposed monitoring programme will form part of an Environmental Management System (EMS) for the pit is as follows:

1. Dust – twice annually between April and September at 3 locations (D1, D2 and D3) on the site perimeter.
2. Noise – Once annually at 3 noise sensitive locations (N1, N2, and N3) – one-hour intervals.
3. Groundwater – Groundwater level monitored monthly at the site boreholes (BH1 – BH3). Levels at the nearest neighbouring supply wells will also be carried out with permission from the owners – i.e. at H1, H2, H3 and H4.
4. Surface Water – Twice annually at three locations (SW1, SW2 and SW3); upstream and downstream of the site in the Clashavoon Stream and Laney River. Parameters to be tested are:

    a. pH (field measurement)
    b. Temperature (field measurement)
    c. Electrical Conductivity (field measurement)
    d. Dissolved Oxygen (field measurement)
    e. Turbidity (field measurement)
    f. Total Suspended Solids (laboratory analysis)

Monitoring points are shown on Figure 4-1 (noise monitoring locations – N1, N2 and N3), Figure 6-1 (dust monitoring locations – D1, D2 and D3), Figure 7-2 (surface water monitoring locations – SW1, SW2 and SW3), Figure 8-5 (well locations – BH1, BH2, BH3, W1, W2, W3 and W4).

2.5 Lifespan & Restoration

Section 4.9 of the Department Guidelines[6] deals with the lifespan of planning permissions for quarries. It states –

'*Where the expected life of the proposed quarry exceeds 5 years it will normally be appropriate to grant permission for a longer period (such as 10 - 20 years), particularly where major capital investment is required at the outset. In deciding the length of the planning permission, planning authorities should have regard to the expected life of the reserves within the site. The purpose of setting a finite period is not to anticipate that extraction should not continue after the expiry of that period, but rather to enable the planning authority, in conjunction with the developer and environmental authorities, to review changes in environmental standards and technology over a decade or more since the original permission was granted. In considering whether a further permission should be granted, the planning authority should have regard (inter alia) to the following factors:*

(a) The extent of the remaining mineral resources and
(b) The extent of existing capital investment in infrastructure, equipment, etc

Ummera gravel pit has been in operation since the 1940's with the current arrangements coming into effect since the late 1970's. There are reserves at the site for a further 15 years approximately, so this application (under Section 37L of the EU (Environmental Impact Assessment and Habitats) Regulations 2015) is being made for the continued operations at Ummera. Restoration and after-care of the quarry is addressed in Section 3.6 of the Guidelines. It states -

'All proposed extractive development proposals must be accompanied by detailed restoration and after-care plans (although in the case of sites with a long working life, it may be appropriate to establish the need for such plans at the outset, while leaving the details to be agreed either on a phased basis or towards the end of the extractive process). Progressive restoration should be employed where relevant and practicable, e.g. for sand and gravel pits'.

It is proposed to return the Ummera gravel pit to agricultural use after extraction is completed. While it would have been preferable to commence phased restoration of the pit, the nature of the deposits has made this difficult to date; the gravel deposit is not homogeneous. Going forward, phased restoration will need to be implemented to better manage the silt cleaned from the settlement ponds and reduce the area of land with exposed soils. The restoration plan for the gravel pit is provided in Figure 11-6.

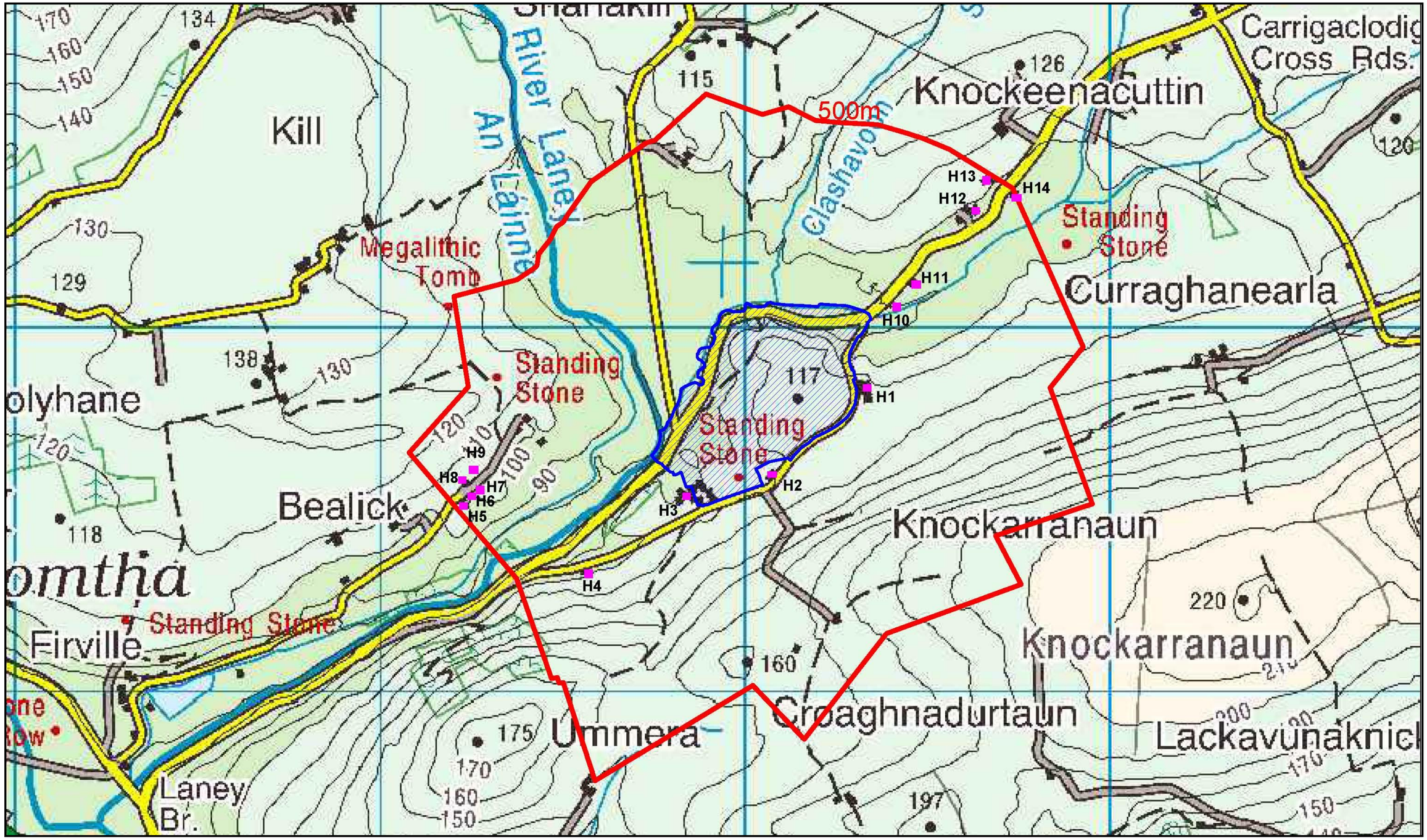


Figure 2-1: House Location Map

Figure 2-2: Proposed Site Layout Map

3. POPULATION & HUMAN HEALTH

This chapter of the EIAR addresses human beings in the vicinity of the site. It assesses the local population, settlement patterns and human health; the significant effects associated with the gravel pit on these aspects; and the mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented. The aspects covered include demographics, public health and quarries, socio-economics and tourism. The other areas examined with respect to the effects of gravel extraction on humans are noise (Chapter 5), traffic (Chapter 4), air & climate (Chapter 6) and visual impacts (Chapter 11). Cumulative impacts are discussed where relevant.

3.1 Human Beings in the Existing Environment

Ummera gravel pit is in a rural setting approximately 2.5km to the northeast of Macroom. It is in the electoral division (ED) of Macloneigh, as shown on Figure 3-1. Macloneigh ED is large, extending to 30.7km^2 and wrapping around Macroom Town. The nearest settlements are Macroom, Carrigadrohid and Coachford. The nearest town is Macroom, 2.5km to the southwest. Figure 2-1 (Discovery Series Map No. 79) shows the site location map.

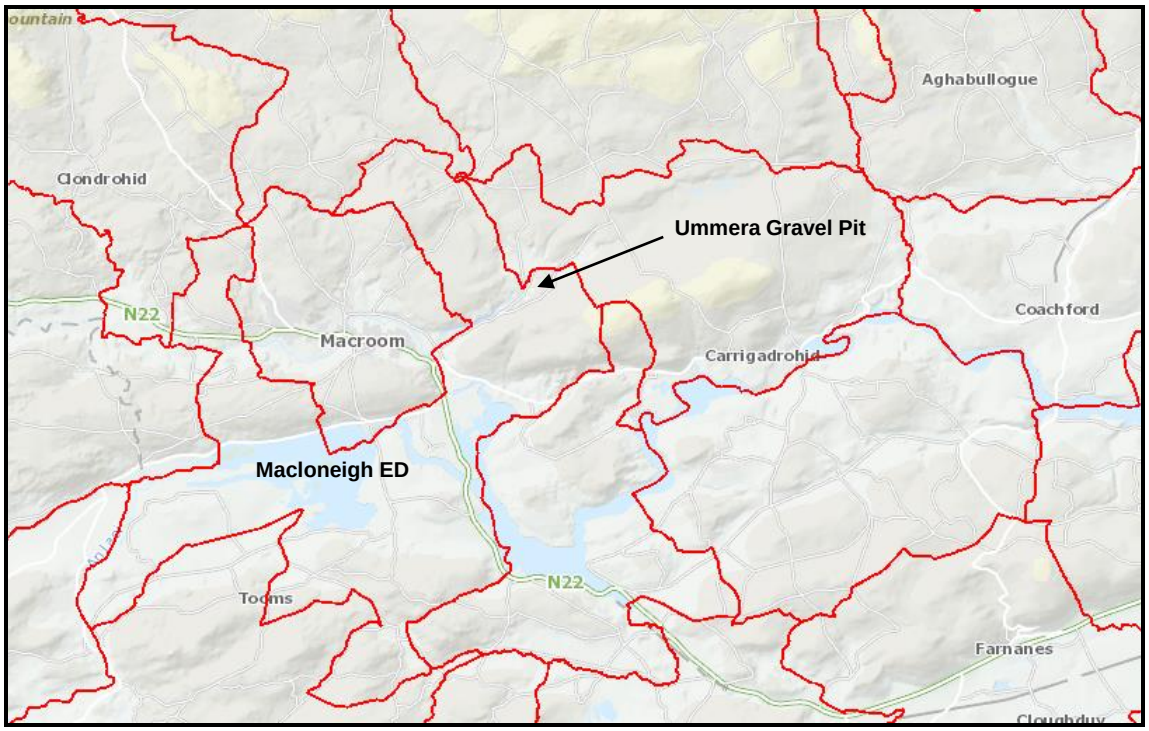


Figure 3-1: Electoral Division Map

According to the Central Statistics Office (CSO), the population of County Cork in 2016 was 417,211, making up 8.76% of entire population of the State. The rural / urban split of the State is 37.3% / 62.7%. The 2016 figures for the State represent a 3.8% increase over the 2011 census population figures, representing a faster growth rate then the period 2006 – 2011 (of 1.6%). The population of County Cork grew by 4.4% over the 5-year period 2011-2016.

3.1.1 Recreation and Amenity

Tourism is recognised in the Cork CDP as playing an important contribution to the socioeconomics of the County and is strongly encouraged. County Cork is recognised as one of the leading tourist counties in Ireland, being the most visited outside Dublin. It is recognised as an important contributor to the local economy. Bord Failte provides figures for 2012 on a county basis (Bord Failte, 2012)[13]. For County Cork, there were 1,228,000 overseas visitors which generated €399M in revenues. Tourism has been identified as an important sector for job creation in the County.

The scenery and natural heritage of County Cork is the primary tourist attraction. There are a range of attractions from mountains, lakes, rivers, rugged coastlines, woodlands etc. with their associated activities including trekking, hill walking, mountaineering, water sports, fishing, sailing etc. The CDP lists '*Fota Wildlife Park, Blarney Castle, Middletown Distillery – Jameson Experience, Cobh Heritage Centre, Kinsale (including Charles Fort), Mizen Head Signal Station, Garnish Island, West Cork Model Railway, Barryscourt Castle, Desmond Castle, Dursey Island Cable Car, Gougane Barra, Cobh Cathedral, Bantry House and Gardens and Doneraile House and Park, Skibbereen Heritage Centre and Mallow Castle*' as key tourist attractions of national importance with and significant visitor numbers. Figure 3-2 shows the key tourist assets in County Cork (Figure 8-1 of the CDP).

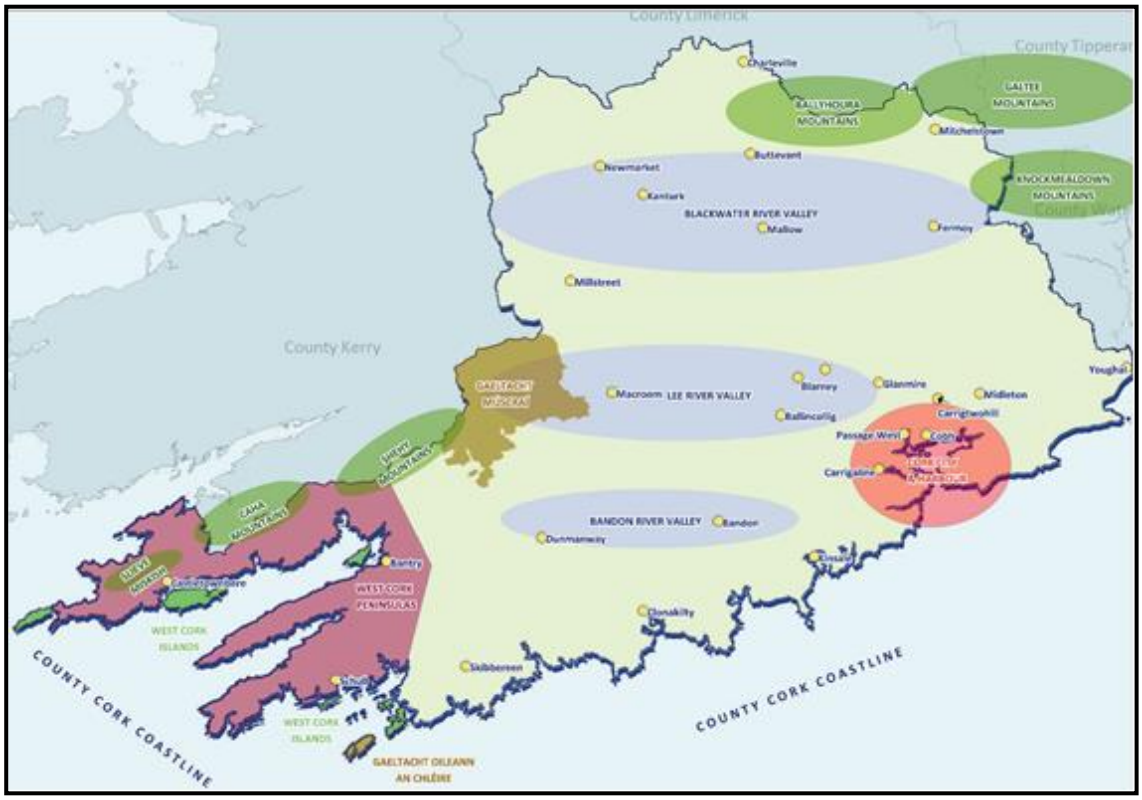


Figure 3-2: Key Tourists Assets in County Cork
Source – Cork County Development Plan 2014

The Ummera gravel pit is located within the Lee River Valley area but is not located along the main tourists' routes through the valley – N22 (Cork to Killarney) or R618 (Blarney to Macroom).

3.1.2 Settlement Pattern near Site

As noted in Section 2.1.1, the settlement pattern in the area is one of scattered farmhouses and once-off housing. There are 14 dwellings within 500m of the landownership boundary offset. These are listed in Table 2-1 and are shown on Figure 2-1. As shown in Table 2-1, the nearest dwelling is 5m from the ownership boundary and 15m from the Section 37L application boundary. Approximately half of the houses were built since the gravel pit was opened.

3.2 Public Health & Extraction Industry

The issues associated with public health and gravel pits relate to noise, air quality and traffic. Noise is discussed in Chapter 5; air quality is discussed in Chapter 6 and traffic is discussed in Chapter 4. The significant effects associated with the gravel pit on these aspects of public health are:

Noise

1. Noise levels are not expected to have exceeded relevant emission limit levels at the nearest receptors during its lifetime. The workings (processes and intensity) at the gravel pit have remained largely unchanged for many decades, apart from the natural progression of the working face to the south.
2. Working hours are generally kept to 9am – 5pm during weekdays and 9am to 1pm on Saturday.
3. Potholes occurring in the access road are periodically repaired to reduce truck noises.

It is determined that the workings at the gravel pit have not given rise to noise nuisance for local residence and based on modelling for the further development, will not give rise to nuisance in the future.

Air Quality

1. Dust nuisance has given rise to complaints from the nearest residents located downwind of the gravel pit with respect to the predominant wind direction. These were most pronounced in the late 1990's / early 2000's.
2. A dust suppression system was installed in the late 1990's at the gravel pit, which extended along the access road and along the top edge of the working face. The pipework for this spray system has fallen into disrepair. However, dust emissions in recent years has not given rise to complaints.
3. Fugitive dust emissions from the gravel pit are monitored. Results generally indicate compliance with emission limit values.
4. The material processed is washed, so doesn't give rise to dust emissions. The finer product is stored in concrete bins and protected from wind. The coarser material is stored in the open, but too large to give rise to dust emissions. Dried silt is the greatest risk of fugitive dust emissions. The silt is seeded with grass to reduce erosion potential. A programme for using this silt in site restoration will also be implemented.
5. In addition, it is intended to pave the access road from the site entrance to the site office. This will be kept clean, so HGVs entering/leaving the site are less likely to give rise to fugitive dust emissions. A speed limit of 15kph will be imposed for traffic accessing the gravel pit.

Traffic

1. The entrance to the gravel pit has good sight lines for HGVs entering from and leaving to the south – the predominant direction of travel.
2. DWCL HGVs access the regional / national road network within 2.1km.
3. There is warning signage at the approach to the pit entrance and an additional sign will be erected further south for traffic on the southern approach to give greater warning.

3.3 Human Beings – Impacts Assessment

3.3.1 Health and Safety

The pit manager has been / is responsible for safety issues on site. Potential hazards may occur in an active gravel pit from construction and operation practices and include:

- Equipment/plant movement around the gravel pit.
- Working near open water (i.e. working near the settlement ponds or Clashavoon Stream).
- Truck traffic to and from the gravel pit.
- Personal injury.

- Noise from plant and machinery.
- Fire.
- Failure of working faces / silt stockpiles.

While the gravel pit is located on private lands and unauthorised access is discouraged, it is possible for unauthorised access to the gravel pit.

3.3.2 Socio-Economics

The gravel pit directly employs 1 fulltime worker, 2 additional workers on occasion and (indirectly) up to 5 drivers employed by DCWL to draw aggregate from the gravel pit. These numbers will remain reasonably consistent during the further development of the gravel pit. Some of the workers live locally, so directly support the local economy. The aggregates produced will continue to directly support the local construction industry.

3.3.3 Recreation, Amenity & Tourism

The gravel pit is in a rural settling distant from any population centres, local amenities (GAA clubs, churches, schools, parish halls, etc.) or tourist destinations. No direct or indirect significant impacts on tourism or local amenities are envisaged to occur in the future. It is not visible from any of the tourist assets in the Mid Cork area. The amenity of each residence could potentially be impacted by extraction activities by way of HGV traffic, noise and dust. These are discussed in detail in Chapters 4, 5 and 6, respectively.

3.4 Human Beings – Mitigation Measures

3.4.1 Health and Safety

The approach to ensuring safe and healthy working conditions for employees at the gravel pit that has been implemented at the site are summarised as follows:

- Identifications of hazards associated with each activity.
- Assessment of risk associated with each hazard.
- Provision of safety training and instruction.
- Provision of protective equipment.
- Consultation with employees on health and safety matters.
- Obtaining copies of sub-contractor's health and safety plans.
- Auditing by an independent safety consultant.

Security at the site to deter unauthorised access include security gate, perimeter fencing and warning signage. The settlement ponds are fenced off. An earthen berm has been constructed along the southern side of the ponds to stop vehicles. The need to add or replace warning signage will be kept under review.

3.4.2 Socio-Economics

No mitigation measures are deemed necessary for socio-economics.

3.4.3 Recreation, Amenity & Tourism

No significant impacts are envisaged, so no mitigation has been implemented.

3.5 Conclusions on Human Beings

The Ummera gravel pit has not had a significant negative impact on human health or population in the local area. Measures have been put in place and are proposed to control emissions from the gravel pit.

4. MATERIAL ASSETS

This chapter of the EIAR addresses roads and traffic in the existing environment. It assesses the local road network and traffic patterns; the significant effects that might be associated with the further development of the gravel pit; and the mitigation measures being implemented or proposed to be implemented to address the impacts identified are also presented.

4.1 Existing Road Network

The nearest national road to the Ummera gravel pit is the N22, which runs in an east-west direction approximately 3km to the south of the gravel pit. The N22 is scheduled to be upgraded in 2020-2021 with the construction of the Macroom Bypass. The gravel pit is accessed from the N22 using the regional road R618 (Macroom – Coachford road) and local road L-3423. The entrance to the gravel pit is from local road segment L-3423-20 – see Plate 4-1. This road passes between the gravel pit (extraction area) and the original settlement ponds used for treating wash water; and also forms the northern boundary of the pit. Local road L-34231-0 forms the eastern and south-eastern boundary of the gravel pit. The road network is shown on Figure 4-1. HGV traffic from the gravel pit generally turns left (south) from the gravel pit, travelling towards the N22. Most of the gravel extracted is taken the DCWL's production facility in Bredagh Cross Drimoleague.

The L-3423 / R618 junction is the first major junction encountered by HGV traffic exiting the gravel pit. The junction is at the outside of a 90º curve in the R618, so sightlines are good at this junction; visibility to the left (east) is approximately 160m and visibility to the right (south) is approximately 150m. Plate 4-2 shows the views at this junction for traffic entering the R618. DCWL HGVs travel to the N22, travel east to the R587 and head south through Kilmichael and into Dunmanway and from there to Bredagh Cross, Drimoleague.

Plate 4-1: View of Pit Entrance from Local Road L-3423 – Looking North

Plate 4-2: View of L-3423 / R618 Junction from Local Road

4.1.1 Traffic Counts

DCWL engaged Abacus Transport Surveys to carry out a traffic count for the gravel pit in 2007. The traffic count was conducted on 16 January at the junction (L-3423 / L-7478 junction) just south of the pit entrance between 07:00 and 19:00. Six movements were recorded as shown in Plate 4-3. The hourly movements are summarised in Table 4-1. The detailed traffic count data is provided in Appendix 4-1.

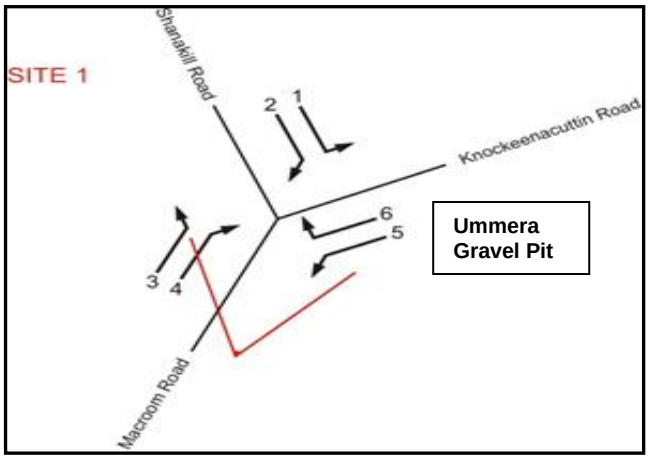


Plate 4-3: Traffic Count Movements

Table 4-1: Summary of Traffic Count Data – January 2007

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	0	3	0	1	0	0	0	14	0	0	18
8 – 9	0	0	2	7	0	4	2	5	0	20	0	0	40
9 – 10	0	0	1	3	1	3	3	19	2	29	0	1	62
10 – 11	0	0	0	2	0	3	0	9	1	16	0	0	31
11 – 12	0	0	0	2	0	6	2	17	1	13	0	0	41
12 – 13	1	1	1	3	1	2	1	20	2	14	1	2	50
13 – 14	0	1	0	3	1	5	0	11	1	9	0	0	31
14 – 15	1	0	0	2	0	7	2	11	3	7	2	0	36
15 – 16	3	0	0	2	0	2	0	21	1	17	2	0	48
16 - 17	2	0	1	2	1	8	1	9	2	10	3	0	39
17 – 18	0	0	1	6	0	11	1	18	1	14	0	0	52
18 - 19	0	0	0	2	0	7	0	32	0	6	0	0	47
TOTAL	7	2	6	32	4	59	12	172	14	169	8	3	495

Notes:

1. 'Other' refers to cars, buses and light good vehicles, which would generally not be associated with the gravel pit.

The total daily traffic flow through the junction during the day was 495 vehicles, with peak flows occurring between 09:00 – 10:00 in the morning. Traffic flow volumes fell into late morning with a slight spike approaching lunchtime and peaking again between 17:00 and 18:00. During the hours of peak traffic volumes, most of the traffic travelled straight through the junction along the L-3423, passing the pit entrance. Approximately 10.3% of the traffic are HGV's of which 50.9% are likely to be associated with Ummera gravel pit; the number of HGVs entering/existing the pit were not recorded, but those making movement 4 and 5 are assumed to be pit traffic, but this likely overestimates gravel pit HGV traffic.

The traffic count was repeated on 30 May 2019 between 07:00 and 19:00 at the same location, with the same movements recorded. Traffic entering and leaving the gravel pit was noted. The count data is summarised on Table 4-2.

Table 4-2: Summary of Traffic Count Data – May 2019

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	3	9	0	2	0	2	1	17	0	0	34
8 – 9	0	2	0	6	0	6	1	9	0	22	0	1	47
9 – 10	0	0	0	13	1	12	0	11	0	26	0	1	64
10 – 11	0	2	2	12	0	8	2	16	1	10	0	2	55
11 – 12	0	0	0	9	0	6	1	19	2	28	0	0	65
12 – 13	0	0	0	3	1	6	0	24	0	18	0	2	54
13 – 14	0	0	1	5	0	10	1	20	0	25	1	0	62
14 – 15	0	2	0	7	0	4	0	13	1	23	0	0	49
15 – 16	0	0	0	7	1	8	0	27	0	15	0	0	58
16 - 17	0	0	0	7	1	16	0	21	0	11	0	2	58
17 – 18	0	0	1	5	3	17	0	24	0	17	0	0	67
18 - 19	0	0	0	6	0	11	0	23	0	22	0	0	62
TOTAL	0	6	7	89	7	106	5	209	4	234	1	8	676

A further traffic count was carried out on 08 October 2019 when schools were opened. The traffic count replicated the count of May 2019. The count data is summarised on Table 4-3. The 2019 traffic count data is provided in Appendix 4-2.

Table 4-3: Summary of Traffic Count Data – October 2019

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	3	7	0	3	0	2	1	16	0	0	32
8 – 9	0	1	0	8	1	6	1	9	0	25	0	1	52
9 – 10	0	0	0	12	1	9	1	11	0	27	0	1	62
10 – 11	0	2	2	10	0	5	3	16	1	10	0	2	51
11 – 12	0	0	1	8	0	8	1	16	3	19	0	0	56
12 – 13	0	0	0	2	2	6	0	18	0	9	0	1	38
13 – 14	0	0	1	4	0	9	2	17	0	22	1	0	56
14 – 15	0	1	0	6	0	4	1	12	0	21	0	0	45
15 – 16	0	0	0	7	1	7	2	21	0	10	0	0	48
16 - 17	0	0	0	9	1	14	2	17	0	7	0	2	52
17 – 18	0	0	1	6	3	16	0	20	0	18	0	0	64
18 - 19	0	0	0	6	0	11	0	22	0	18	0	0	57
TOTAL	0	4	8	85	9	98	13	181	5	202	1	7	613

The traffic counts in 2019 show a 36% (May) and 24% (October) increase in traffic movements over the 12-year period between the count dates. There is a reduction in the 'other' vehicle types between May and October, which is attributed to the absence of agricultural activity. Traffic associated with the gravel pit during the 2019 counts included:

- 2 No. workers' vehicles accessing the gravel pit at 09:00 and leaving at 17:00.
- 2 No. and 4 No. HGV loads in May and October, respectively.

- 2 No. and 1 No. tractor trailer loads in May and October, respectively.
- 1 No. car with trailer in both May and October.

4.1.2 Site Entrance

The current entrance to the gravel pit was created in the 1990's using an existing agricultural entrance. The original pit entrance was located at the northwest corner of the pit with limited sightlines in both directions. The current access road to the gravel pit from local road L-3423-20 is unpaved. The entrance is just north of the junction of the L-3423-0 and L-7478. The L-3423 has an 80kph speed limit. The sightlines at the pit entrance are approximately 220m to the north and 70m to the south. Ideally, these would be 160m for a road with a speed limit of 80kph. Plate 4-4 shows the views at the pit entrance. Sightlines for HGVs entering the pit from the south are good, with visibility of approximately 220m. Hedgerow maintenance is carried out to maintain the slight line distances.

The gate is set back 18m from the road edge allowing a HGV pull off the road safety if the gate is closed.

Warning signage was erected at the approaches to the entrance since DWCL commenced using it in the 1990's – see Plate 4-5.

Plate 4-4: Views from Site Entrance Looking North and South

Plate 4-5: Warning Signage on Approach to Entrance – from North & South

4.1.3 Road Safety

Collison data is available online from the Road Safety Authority – http://www.rsa.ie/en/RSA/Road-Safety/RSA-Statistics/Collision-Statistics/Ireland-Road-Collisions/. Plate 4-6 shows all collisions in the vicinity of Ummera gravel pit for the period 2005 to 2015 and categorised as Fatal, Serious and Minor. Plate 4-7 shows the collisions for the same period but involving only goods vehicles. The year 2005 is the earliest collision data available from this online source.

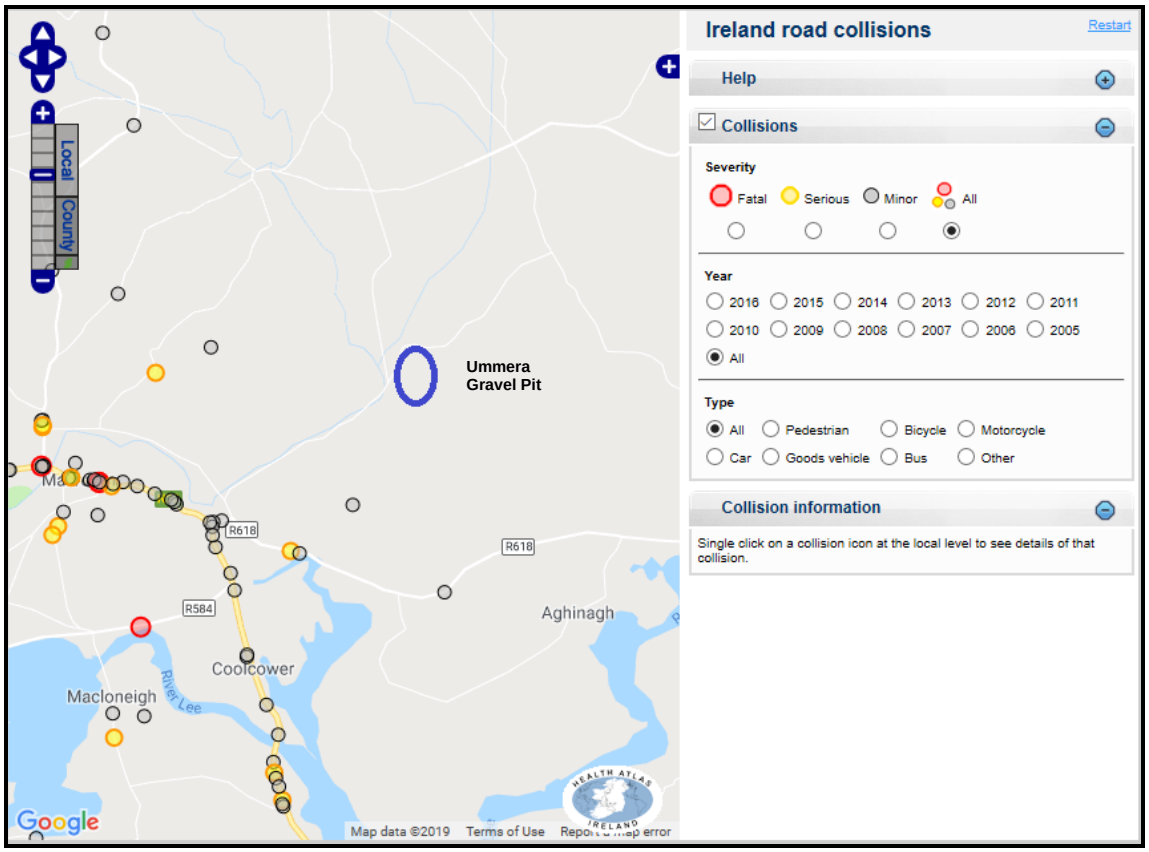


Plate 4-6: RSA Collison Data for Period 2005-2015, All Vehicles

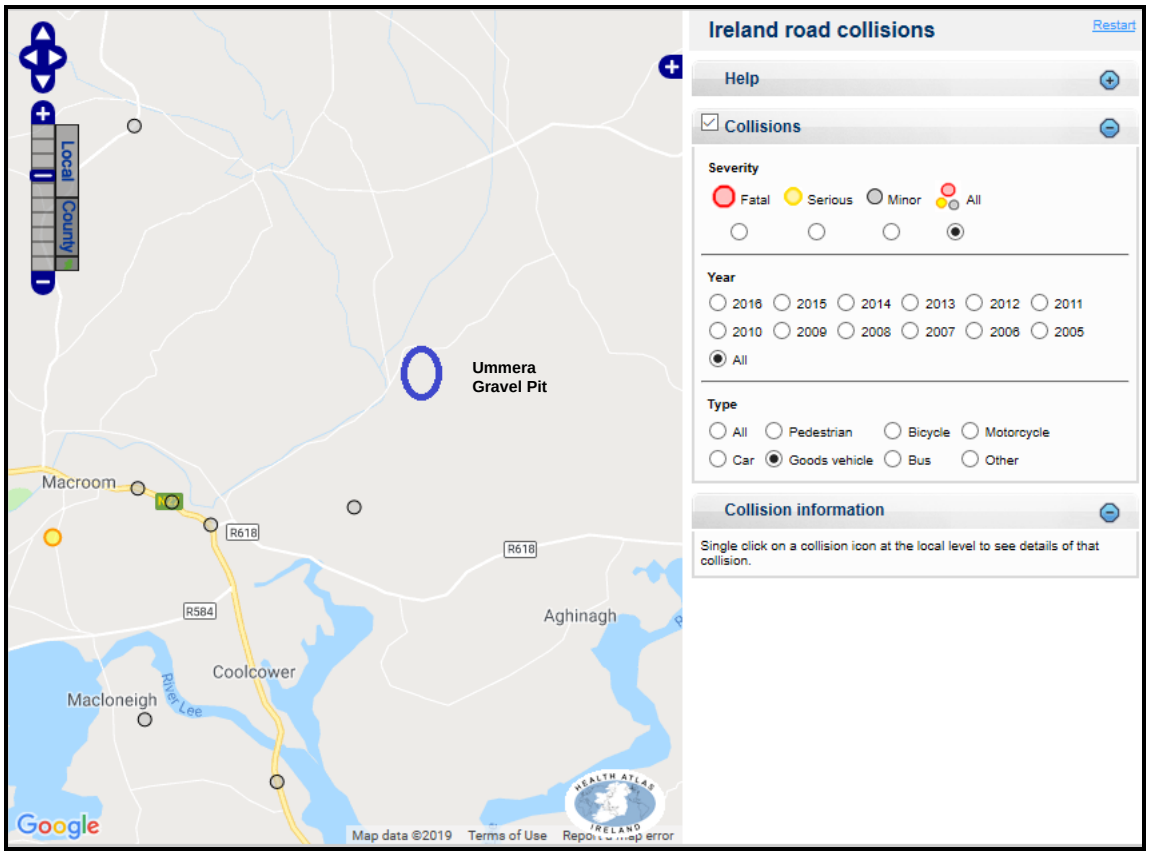


Plate 4-7: RSA Collison Data for Period 2005-2015, Goods Vehicles

As seen on Plates 4-6 and 4-7, there have been no recorded collisions on the local road (L-3423) servicing the gravel pit. Four minor collisions are recorded near the N22 / R618 junction, one of which involved a goods vehicle. It has been confirmed with DCWL that none of the collisions involved HGVs from the gravel pit.

4.2 Impact Assessment

4.2.1 Do Nothing Impact

If the further development of the gravel pit is not advanced, the site will be returned to mostly agricultural use. The traffic associated with Ummera will be displaced to another existing or new gravel pit.

4.2.2 Operational Impacts

The gravel pit generates a small volume of HGV traffic on local road L-3423 – up to 10 loads (20 movements) per day typically. Spread over an 8-hour day, this equates to between 2 and 3 HGV movements per hour. These volumes will be representative of HGV traffic during its further development and is considered an insignificant traffic impact. It is noted that the HGV traffic associated with the gravel pit doesn't conflict with the peak traffic movements recorded on the L-3423 – i.e. car traffic between 08:00 and 09:30 and 16:30 to 18:00.

The low volumes of HGV traffic have not impacted significantly on the quality of the local road.

Sight lines at the pit entrance are below ideal distances, however, most of HGVs enter the gravel pit from the south from which drivers have sight distances of 220m and similarly for HGV traffic leaving the pit.

The opening of the Macroom bypass (currently under construction) will result in less HGV traffic on the sections of the R610 and N22 used by HGVs from the gravel pit travelling to Bredagh Cross. The Macroom bypass is scheduled to open in mid-2023.

4.3 Mitigation Measures

The site entrance into the gravel pit was relocated from its original location in the 1990's. This entrance provides improved sightlines for HGVs entering and leaving the gravel pit and also improves sight stopping distances for traffic passing the site. The ditch to the south of the entrance has been battered back to improve sight distances and the hedgerows are cut periodically to remove obstructions and maintain sight distances. These maintenance activities will be continued by the operator.

While most of the other traffic is local or commuter traffic and familiar with the presence of the Ummera pit, warning signs are in place on the approaches to the site for drivers unfamiliar with the area. A second warning sign will be erected 150m south of the site entrance on the L-3423; the existing sign is 50m from the pit entrance and greater warning to drivers unfamiliar with the area will improve traffic safety.

The access road into the gravel pit will be paved with associated improvements to drainage at the entrance.

4.4 Conclusions on Roads & Traffic

The Ummera gravel pit generates a small volume of HGV traffic on local road L-3423, typically less than 10 HGV loads per day. This low volume of HGV traffic will remain at these levels for the further development of the gravel pit. The presence of the gravel pit and associated HGV traffic hasn't resulted in collisions, likely a result of local users being aware of its presence and the possibility of meeting HGVs on the local road network. Additional warning signs will improve road safety, particularly for users unfamiliar with the area.

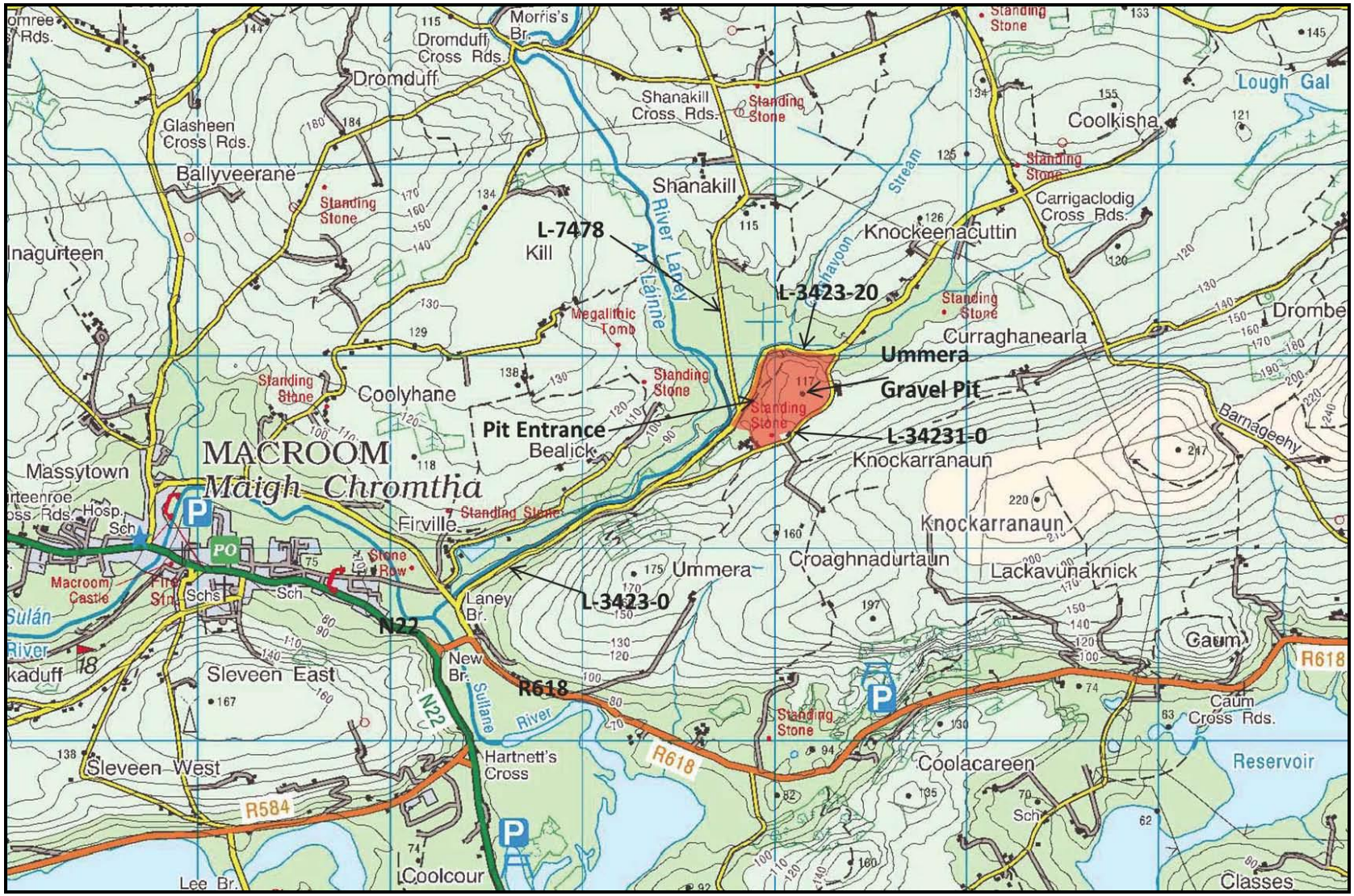


Figure 4-1: Road Network Near Ummera Gravel Pit

5. NOISE

5.1 Introduction

Damian Brosnan Acoustics was instructed by KGEC, on behalf of its client DCWL, to carry out an assessment of potential noise impacts with respect to the further development of the Ummera gravel pit, Macroom. It is proposed to extract downwards below the existing ground elevation in the current works area, and also to extend horizontally to the south and southwest. The assessment is required for inclusion in an EIAR to be included with an application to An Bord Pleanála for further development, following the recent application for substitute consent. The assessment relates to impacts which may arise with the further development of the gravel pit.

While the further development will not require construction works in the conventional sense, it is proposed to store overburden in a perimeter berm around the extension area. As construction of the berm will be a short-term operation undertaken prior to excavation in the extension area, and as the berm will subsequently provide acoustic screening with respect to receptors, the overburden removal and berm construction operation may be considered a temporary construction activity, and is therefore assessed in light of construction criteria identified below

Sand and gravel extraction operations typically do not give rise to groundborne vibration and thus vibration has been scoped out of this assessment.

The assessment has been undertaken with reference to *Advice notes for preparing environmental impact assessment reports* (EPA, 2015, draft) and *Guidelines on the information to be contained in environmental impact assessment reports* (EPA, 2017, draft). In keeping with these, this assessment describes the existing environment (baseline); identifies, describes and assesses the noise effects of the proposed further development; proposes mitigation and monitoring measures where appropriate; and identifies any residual effects remaining.

The following documents were consulted in the preparation of this assessment:

- *Guidelines on community noise* (World Health Organisation, 1999).
- *Draft guidelines for noise impact assessment* (Institute of Environmental Management and Assessment, and Institute of Acoustics, 2002).
- *Quarries & ancillary activities: Guidelines for planning authorities* (Department of the Environment, Heritage & Local Government, 2004).
- Environmental management guidelines: Environmental management in the extractive industry (non-scheduled minerals) (EPA, 2006).
- BS 4142:2014 Methods for rating and assessing industrial and commercial sound (British Standards Institution, 2014).
- *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise* (British Standards Institution, 2014).

A baseline noise survey was undertaken in accordance with *International Standard ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels* (2017), while predictive modelling was carried out using *International Standard ISO 9613-2:1996 Acoustics: Attenuation of sound during propagation outdoors – Part 2 General method of calculation* (1996).

5.1.1 Statement of Authority

The assessment was undertaken by Damian Brosnan, who has the following qualifications and experience:

- BSc (Honours) 1993 (University College Cork).
- Postgraduate diploma in Acoustics & Noise Control 2009 (Institute of Acoustics).
- MSc (Distinction) in Applied Acoustics 2015 (University of Derby).
- Certificate of competence in workplace noise risk assessment (Institute of Acoustics).
- Member of Institute of Acoustics (MIOA) & secretary of Irish IOA branch.
- Founding member of Association of Acoustic Consultants of Ireland (AACI).
- Member of Engineers Ireland (MIEI).
- Engaged with continuing professional development through IOA & EI.
- Working in noise since 1996, and has worked on several hundred noise projects.
- 1996-2001: Noise Officer with Cork County Council.
- 2001-2014: Partner with DixonBrosnan Environmental Consultants, specialising in EIA.
- 2015--: Principal at Damian Brosnan Acoustics.

5.2 Criteria

The then Department of the Environment, Heritage & Local Government (**DOEHLG**) document *Quarries & ancillary activities: Guidelines for planning authorities* (2004) sets out guidance for local authorities in the assessment of quarry planning applications. Although initially issued to provide guidance with respect to the 2005-2007 quarry registration process as set out in S.261 of the Planning & Development Act 2000, the DOEHLG document remains valid and in force. The DOEHLG document draws on guidance presented in Environmental Protection Agency (**EPA**) report number MS-2000-M1, subsequently published in 2006, and titled *Environmental management guidelines: Environmental management in the extractive industry (non-scheduled minerals).*

The DOEHLG guidance and the related EPA document recommend a daytime noise limit of 55 dB, measured using the $L_{Aeq\ 1\ h}$ parameter, approximately equivalent to the average noise level from all on-site sources measured over one hour. The documents additionally recommend that audible tonal and impulsive components be minimised. The limit is typically applied at offsite noise sensitive locations, defined by the EPA as:

> *Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.*

From the foregoing, a 55dB daytime $L_{Aeq\ 1\ h}$ limit is considered the most suitable criterion with respect to the proposed development, applicable at offsite receptors during daytime working hours. The criterion relates to the specific $L_{Aeq\ 1\ h}$ parameter i.e. the noise level specifically attributable to all sources at the DWCL site, and thus excludes extraneous offsite sources such as traffic. The criterion applies externally at sensitive receptors.

Noise impacts may be assessed by reference to existing background levels. The degree of impact is proportional to the magnitude of increase attributable to the proposed development. There is no clear guidance here. *British Standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound* (2014) notes that an increase of 5dB suggests an adverse impact. This is consistent with the DOEHLG document which notes that '*complaints will result where the noise from quarrying and associated activities are between 5 to 10dB above the background noise levels*'. The 5dB increase represents a 'slight impact' in the *Draft guidelines for noise impact assessment* (Institute of Environmental Management and Assessment, and Institute of Acoustics, 2002). For the purposes of this assessment, the existing DCWL operation is considered part of the background noise environment, having been in operation at this location for several decades.

In accordance with guidance given in *British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* (2014), a 65dB $L_{Aeq\ 1\ h}$ criterion is considered applicable to the construction phase of the proposed development. As noted in above, this criterion is relevant to overburden removal and berm construction.

5.3 Receptors

Local road L-3423 runs northeast from Macroom through the townland of Ummera. Approximately 2.5km from Macroom, the road curves around the northern side of the gravel pit. A small third-class road 1.3km in length curves around the southern side of the site, connecting to the L-3423 at both ends. The applicant's holding occupies much of the area between the two roads. At this location, the ground elevation rises gently southeast, and extraction at the site has been carried out into the slope.

The northern and western boundaries of the DCWL site are formed by local road L-3423. The southern boundary of the working area adjoins pasture in the DCWL holding, beyond which lies the third-class road. Both roads converge outside the eastern boundary of the site.

There are no receptors on the applicant's holding, and no receptors directly adjoin the existing working area or proposed extension area. The nearest receptors (Figure 5-1) are as follows:

- Two dwellings northeast of the converged roads outside the northeast corner of the site, the nearer of which lies 250m from the pit area. Several dwellings lie further northeast. The proposed extension will not shorten this separation distance.
- A farmhouse on the third-class road, 60m from the working area. This represents the closest receptor. The proposed extension will not shorten this separation distance.
- A cottage 140m south of the current working area. It is proposed to extend the extraction area south towards this dwelling, and the separation distance will reduce to approximately 70m.
- A farmhouse 200m southwest of the current working area. This separation distance will decrease to approximately 50m.
- A cottage 540m southwest of the working area. The separation distance here will reduce to 370m.
- Several dwellings also to the southwest, the nearest of which is 680m from the working area. This distance will reduce to 540m as a result of the proposed extension.
- The nearest receptor to the north is 720m from the site. The proposed extension will not alter this distance.
- The nearest receptor to the south lies over 1.4km from the site.

Land use in the local area is predominantly agricultural, with the chief exception being the DCWL sand and gravel workings. The chief noise sources present in the local environment are DCWL operations, agricultural activity and road traffic. Traffic noise occurs intermittently throughout the day from the L-3423 and from road traffic to the north which is audible over the plain. N22 traffic to the south is audible during quieter periods.

Figure 5-1: Ummera Gravel Pit - DCWL holding shown Yellow

5.4 Baseline Soundscape

The baseline soundscape was assessed through two daytime noise surveys. The first was undertaken on 24 October 2019 while the DCWL washing plant was not operating. Although the DCWL loader was in limited use during the survey, there was minimal offsite impact, and measured levels are considered representative of the residual soundscape i.e. the noise environment in the absence of DCWL emissions.

As the baseline soundscape arguably includes existing DCWL operations, which have been carried out at the study site for several decades, a second survey was undertaken 31 October 2019 while the gravel pit was in full operation. During this survey, noise emissions arose from the on-site washing plant in continuous use, the front-end loader in almost continuous use, and from sporadic truck movements.

During both surveys, monitoring was undertaken at four locations representing the nearest receptors (Figure 5-2, Plates 5-1 to 5-4, Table 5-1). Survey details, equipment specifications and weather conditions are listed in Appendices 5-1 and 5-2. Time history profiles are presented in Appendix 5-3, and noise data in Appendix 5-4. Data are summarised in Table 5-2.

Table 5-1: Noise Station Details

Ref.	ITM NGR	Location	Reason for selection
N1	537307 574078	Adjacent to road junction outside NE corner of site	To represent dwellings 100m further NE
N2	537237 573893	Field on E side of gravel pit	To represent farmhouse 30m E
N3	537018 573691	Field on S side of gravel pit	To represent cottage 40m SE
N4	536877 573792	W corner of gravel pit	To represent dwellings 680m WSW

Table 5-2: Noise Data Summary

DCWL	Parameter	N1	N2	N3	N4
DCWL operating	$L_{Aeq\ 1\ h}$ (dB)	47	45	37	40
	$L_{AF90\ 1\ h}$ (dB)	36	40	39	35
DCWL shut down	$L_{Aeq\ 1\ h}$ (dB)	48	42	44	41
	$L_{AF90\ 1\ h}$ (dB)	38	35	34	33

None of the stations was significantly influenced by DCWL loader or truck activity due to the low audibility of these emissions, and thus measured $L_{Aeq\ 1\ h}$ levels were dominated by extraneous sources such as road traffic noise. The $L_{AF90\ 1\ h}$ parameter describes emissions from the DCWL washing plant when operating, due to their continuous and steady character. $L_{AF90\ 1\ h}$ levels measured when the washing plant was shut down were 33-38dB. Levels rose to 35-40dB when the plant was operating, showing an increase of up to 5dB (a decrease evident at N1 was most likely attributable to falling ambient levels due to reduced watercourse flow nearby).

As noted above, the existing DCWL operation may be considered part of the baseline soundscape, and thus measured background $L_{AF90\ 10\ min}$ levels of 36-40dB are considered representative of the baseline.

Figure 5-2: Noise Monitoring Stations

Plate 5-1: N1, looking NE towards public road

Plate 5-2: N2, looking E towards farmhouse

Plate 5-3: N3, looking NE

Plate 5-4: N4, Looking W towards Dwellings in Distance

A noise impact assessment requires a comment on the likely progression of local noise levels into the future, in the absence of the proposed development. Should the development not proceed, it is expected that DCWL operations will gradually wind down. Ultimately the washing plant would be removed and the extraction area would be restored and returned to agricultural use. Noise emissions thereafter will arise from associated land management practices.

Outside the DCWL site, the existing soundscape is likely to remain unchanged in the short term. As the L-3423 is not a major commuter route, and does not connect any settlements to Macroom or national route N22, the road is unlikely to see major changes in traffic patterns in the short term.

Construction of the proposed Macroom bypass has commenced. The new road will run within 1.7km of the DCWL site. A review of the project EIS[14] indicates that ambient noise levels are not predicted to increase in the vicinity of the applicant's site. Thus cumulative impacts are not expected.

5.5 Proposed Future Development

At present, extraction of sand and gravel is concentrated at the southeast side of the site. At the active face, aggregates are removed by the resident front-end loader, and transported by the loader to the washing plant located near the site centre, between the working area and the settlement lagoons. As with all sand and gravel pits, extraction may be moved around within the pit in order to optimise use of the deposit.

Noise emissions arise currently from the loader, used regularly throughout the day, and from the washing plant which runs continuously most days. Emissions also arise sporadically from trucks which access the stockpile area adjacent to the washing plant. The number of truck loads exported is typically 10 per day on average, equivalent to one per hour.

At intervals, typically once per year, a mid-sized tracked excavator is imported to the site in order to remove and stockpile overburden ahead of the working face. This event typically lasts one week each time. It is also used to clear out the settlement ponds at infrequent intervals

On-site plant sources are described in Table 5-3. Operating hours permitted by the current S.261 registration are listed in Table 5-4. The DCWL pit is a small-scale operation, with only one full-time employee based on-site.

Table 5-3: Onsite plant sources

Plant	Usage	Location
Washing plant	Used continuously throughout working day	Between working area and lagoons
Mid-sized front-end loader	Used almost continuously throughout working day	1 Around washing plant area; 2 Between plant and working face; 3 Between plant and stockpile area
Mid-sized tracked excavator	Imported once per year for approx. one week each time; used almost continuously throughout working day during each event	Ahead of main working face
Trucks	10 loads exported per day on average	Tracking between entrance and stockpile area

Table 5-4: Operating Hours

Day	Hours
Monday-Friday	07:00 to19:00
Saturday	07:00 to 14:00
Sunday & public holidays	Closed

It is proposed to continue operations as above, extracting sand and gravel from various points around the site as required. The current planning application seeks to allow a downward and lateral expansion of the extraction void mostly to the south / southwest into agricultural fields (see Chapter 2), with a marginal increase along the eastern face.

There will be no significant implications for the noise regime. Operations will continue as before, with the front-end loader transferring aggregates from the working face to the washing plant. The washing plant and adjacent stockpile will not see any changes, and the number of truck loads exported will continue as at present. When required, a tracked excavator will be imported to remove and stockpile overburden in perimeter berms and to clean out the settlement ponds. This procedure may also require use of a 6x6 dump truck in order to relocate the existing berms.

5.6 Impact Assessment

5.6.1 Do Nothing Impact

If the further development of the gravel pit is not advanced, the site will be returned to mostly agricultural use. The noise associated with this restoration work will occur earlier than would otherwise be the case. Operational noise associated with extraction activities will be displaced to another existing or new gravel pit.

5.6.2 Operational Phase

Noise emissions will continue as at present, and noise levels at surrounding receptors are likely to be similar to those measured during the survey of 31 October 2019 when operations were underway. Noise data measured 31 October 2019 may be summarised as follows:

- At N1, the washing plant was slightly discernible continuously. Measured $L_{AF90\ T}$ levels were not representative of washing plant immissions (see **glossary**) due to continuous intrusion from a nearby watercourse. The washing plant contribution was thus less than the measured $L_{AF90\ 1\ h}$ range of 36-37dB. The loudest loader movements were slightly audible here.
- The washing plant was continuously audible at a low level at N2, and measured $L_{AF90\ 1\ h}$ levels of 39-42dB are representative of the plant, with the 3dB variation attributable to plant load. The loader was also slightly audible here at intervals.
- The washing plant was barely discernible at N3. Measured $L_{AF90\ 1\ h}$ levels of 30-32dB here were not representative of plant immissions due to distant N22 traffic audible to the south. The loader was slightly audible here on occasion.
- The washing plant was slightly audible continuously at N4, where measured $L_{AF90\ 1\ h}$ levels of 35-38dB were representative of plant immissions. Loader movements were also slightly audible here. $L_{Aeq\ 1\ h}$ levels at N4 were dominated by road traffic outside the boundary.

Measured data indicate that audible washing plant immissions currently give rise to specific $L_{Aeq\ T}$ levels less than 40dB at N1, N3 and N4. At N2, the nearest station to the operations area, washing plant levels rise to 42dB. Loader operations generate negligible contributions due to their low amplitude and infrequent occurrence. DCWL noise levels are thus markedly lower than the 55dB $L_{Aeq\ 1\ h}$ limit recommended by the DOEHLG. No tones or impulses were noted in site emissions.

The proposed development will involve loader operations in new zones around the perimeter of the site. These will be located close to the southern and south-western boundaries. At surrounding receptors, noise impacts associated with the expansion of loader operations into these new areas will be minimal for several reasons:

- Apart from two dwellings near the southwest corner, separation distances with respect to receptors will remain significantly large and will be several hundred metres at a minimum. Loader operations in the proposed extension areas are therefore likely to be inaudible at all receptors apart from the two nearest dwellings. This is consistent with data measured during the survey of 31 October 2019.
- Although the working face will approach to within 50m of the cottage to the south, it is noted that the pit floor elevation will be approximately 5m below existing ground elevation. The cottage will be afforded screening by the working face, and by a perimeter berm above the face, resulting in an acoustic barrier approaching 8m in height. The 8m barrier and 50m separation distance are likely to render the loader faintly audible at worst at the cottage, when working at this end of the site.
- At the farmhouse outside the southwest corner, a perimeter berm will similarly provide acoustic screening. It is noted that this dwelling lies over 400m from the washing plant and stockpile area.

From the foregoing, noise emissions from the washing plant, loader and trucks will be satisfactory in the context of existing ambient noise levels. A negligible increase in noise levels is expected at receptors, resulting in an imperceptible impact.

In contrast, noise emissions from overburden removal and berm construction are likely to be more clearly audible at the two receptors near the southwest corner. Berm construction near the receptors is likely to be required only once during the lifetime of the proposed development, lasting for 1-2 weeks. The greatest impact will arise when berm construction approaches the closest point with respect to these dwellings.

Overburden removal at the site usually involves use of a single tracked excavator. As the proposed expansion will require the levelling of an existing berm along the edge of the working area, and the relocation of the stored soil to a new berm along the perimeter of the proposed extension area, it is likely that a 6x6 dump truck will also be required for this project. Noise emissions from a typical mid-sized tracked excavator and 6x6 dump truck are presented in Table **5-5**, taken from BS 5228-1:2009+A1:2014.

Table 5-5: Noise Levels at 10m from Berm Construction Plant (dB)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total $L_{Aeq\,T}$
Tracked excavator (25 t)	95	84	79	73	70	68	64	57	77
6x6 dump truck	85	80	77	72	74	70	65	58	78

Berm construction activity was modelled using DGMR iNoise v2020 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation of sound during propagation outdoors – Part 2 General method of calculation* (1996).
- Soft ground assumed throughout.
- No screening.
- Receiver height: 4m.
- Levels not rated for character.
- Plant output data taken from Table 5-5. 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Activity assumed at nearest point of berm to each receptor.

The model output is shown in Figures 5-4 and 5-5. $L_{Aeq\ 1\ h}$ levels predicted at the dwellings (close to their respective facades) during local berm construction will be 57dB at the cottage to the south, and 58dB at the farmhouse to the southwest. These levels will remain below the 65dB criterion identified in Section 5-2 with respect to the berm construction phase. It is reiterated that this activity is expected to last 1-2 weeks and will occur once in these zones during the lifetime of the project. At the end of the project, soil stored in the berms is likely to be redistributed across the worked areas as part of the final reinstatement works. Noise emissions during this period are likely to be similar to the berm construction works, and thus noise levels at the nearest receptors will again remain below the 65dB criterion.

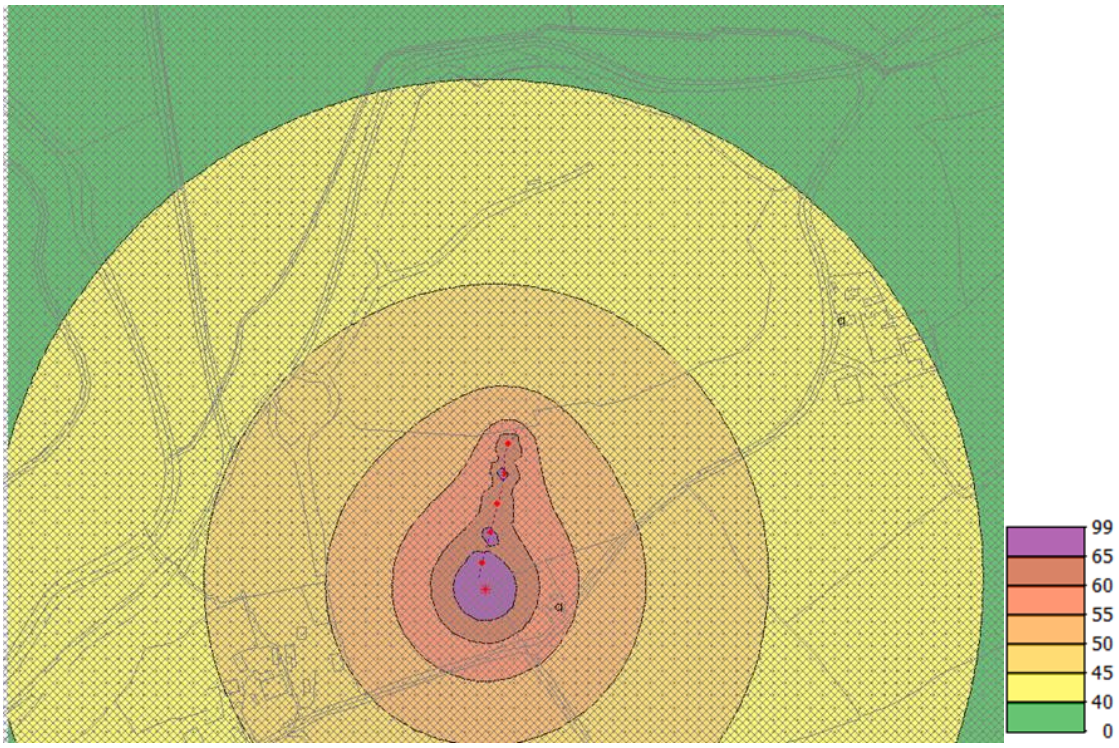


Figure 5-3: Model Output – Berm Construction near Cottage (H2) to South

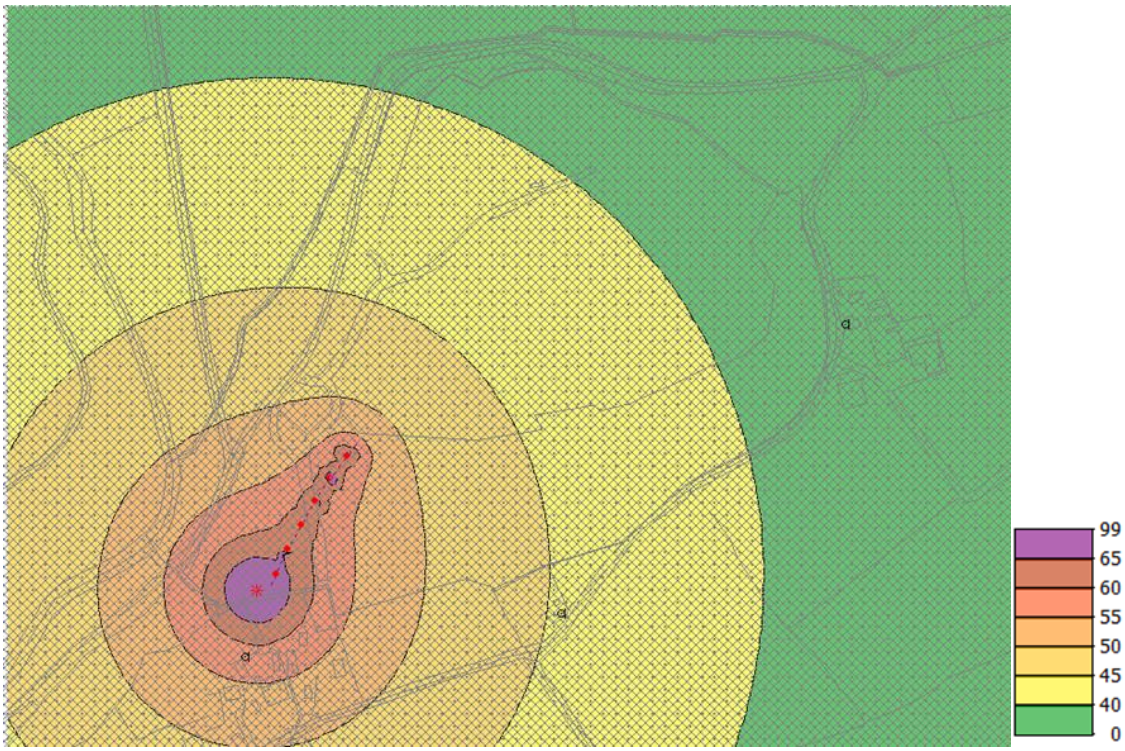


Figure 5-4: Model Output – Berm Construction near Farmhouse (H3) to Southwest

5.7 Population & Human Health

Many noise standards and guidance documents published by various authorities over the last three decades have been informed by criteria recommended by the World Health Organisation (WHO). Their first noise guidance document issued in 1980 concluded that a daytime $L_{Aeq\ T}$ limit around 55dB may be considered a suitable environmental health goal for external noise levels in residential areas, and that levels below 55dB are 'desirable to prevent any significant community annoyance'.

Building on extensive research in the interim, the 1999 WHO document *Guidelines for community noise* includes more specific guidance. The recommended outdoor daytime criterion with respect to serious annoyance remains at 55dB, with 50dB added as an indicator of moderate annoyance, both as façade $L_{Aeq\ 16\ h}$ levels. The 55dB daytime criterion recommended by the 1999 WHO document appears frequently in various guidance documents, including EPA guidance. The 55dB limit discussed in Section 5-2 above is ultimately derived from the WHO guidance.

Although the WHO notes that 50dB is an indicator of moderate annoyance, regulatory authorities typically do not apply a 50dB limit to daytime operators. This is most likely linked to the differing time intervals: the 55 and 50dB WHO criteria relate to a 16-hour day, whereas quarry noise limits are usually specified over 1 hour. Thus, compliance with a 55dB limit for each hour of a 9 to 10-hour working day is likely to facilitate compliance with a 50dB limit over a 16-hour day.

On the basis of the above, it is considered that a 55dB $L_{Aeq\ 1\ h}$ limit provides a sufficient degree of protection to human health. $L_{Aeq\ 1\ h}$ levels attributable to day to day operations at the DCWL sand and gravel pit are comfortably below this criterion at present and will remain below the criterion throughout the lifetime of the proposed further development. Thus, no adverse impacts on the local population or on human health are expected.

5.8 Mitigation

Measured noise data indicate that $L_{Aeq\ 1\ h}$ levels attributable to current DCWL operations are considerably below the 55dB criterion at off-site receptors. Levels are expected to remain comfortably below the criterion throughout the lifetime of the proposed development. During periods of overburden removal and berm construction, including berm construction events close to the two nearest dwellings, $L_{Aeq\ 1\ h}$ levels will be lower than the 65dB criterion applicable to this activity. Thus, no mitigation measures are specifically warranted. However, the applicant proposes to apply the general noise mitigation measures below:

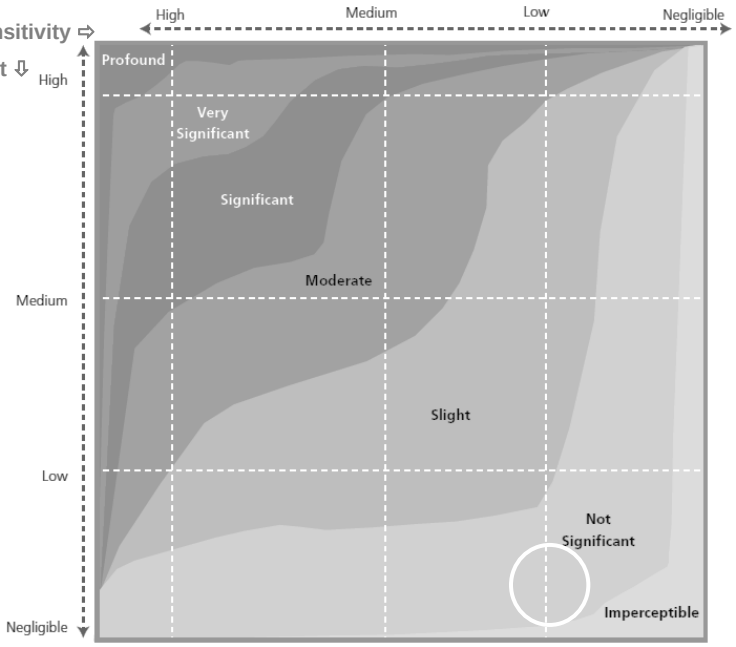
- All plant on site, both fixed and mobile, will be maintained in accordance with manufacturer's recommendations. In particular, exhaust and silencer systems will be maintained in a satisfactory condition.
- Any plant introduced to the site will not be excessively noisy. Where possible, noise data provided by the supplier will be consulted.
- It is recommended that use of truck and plant horns on site is prohibited, including on the site access road.
- It is recommended that the access road be maintained in a satisfactory condition, and that any potholes which may generate rattles in empty truck bodies are repaired immediately. As noted, it is intended to pave the access road into the site.

5.9 Summary of Effects

Impacts and effects are summarised in Table 5-6. No cumulative impacts are identified. Noise impacts will be imperceptible to not significant, on the basis that the proposed development will represent a continuation of the existing operation. During the 1 to 2-week period when berm construction is underway in proximity to the two nearest dwellings, impacts will increase to slight adverse, and will be mitigated by their temporary effect.

Table 5-6: Assessment of impacts & effects.

From *Draft guidelines on the information to be contained in EIARs* (EPA, 2017)
Quality Neutral at most receptors, as no changes will arise over existing soundscape. Slight adverse at two nearest receptors during local berm construction. *May be: **positive** (improves soundscape); **neutral** (no perceptible changes); **adverse** (reduces quality of soundscape)*
Significance Imperceptible to not significant, increasing to slight to moderate at two nearest dwellings during local berm construction. *May be: **imperceptible** (capable of measurement, but without significant consequences, <2 dB change); **not significant** (causes noticeable changes to soundscape, but without significant consequences, 2-4 dB change); **slight** (causes noticeable changes to soundscape without affecting its sensitivities, 4-6 dB change); **moderate** (alters soundscape in manner consistent with existing and emerging baseline trends, 6-10 dB change); **significant** (alters soundscape due to source character, magnitude, duration or intensity, 10-15 dB change); **very significant** (significantly alters soundscape due to source character, magnitude, duration or intensity, 15-20 dB change); **profound** (obliterates soundscape, >20 dB change)*
Extent Local only. *Refers to: development area size, receiving area affected, number of receptors affected, proportion of population affected*
Context Conforms with soundscape, as pit has been worked since 1940s. *Refers to: conformity or contrast with existing & emerging soundscape*
Probability Likely. *May be: **likely** (reasonably expected to occur); **unlikely** (reasonably expected not to occur)*
Duration Medium to long term. Local berm construction works will be temporary. *May be: **momentary** (seconds or minutes); **brief** (<1 day); **temporary** (<1 year); **short term** (1-7 years); **medium term** (7-15 years); **long term** (15-60 years); **permanent** (>60 years)*

From *Draft guidelines on the information to be contained in EIARs* (EPA, 2017)
Frequency Monday-Saturday. *Refers to: occurrence of impacts*
Reversibility Impacts may be reversed at any time in the future. *May be: **reversible** (may be undone in the future); **irreversible** (cannot be undone following onset, thus permanent)*
Indirect impacts None identified. Truck movements exceptionally low in context of traffic volumes. *Refers to: secondary impacts not directly attributable to development, often removed from site*
Cumulative impacts None identified. N22 project EIS suggests no increase in ambient noise levels will occur locally. Given the low intensity of extraction, no cumulative impacts with road traffic will occur. *Refers to: combined impacts with other projects or sources*
Worst case impact No critical noise mitigation measures in place at present or historically, and no such measures required. *Refers to: situation where mitigation measures substantially fail*
Indeterminable impacts None likely. *Refers to: situation where full consequences of change in soundscape cannot be described*
Residual impact On the basis of the foregoing, the overall residual impact is circled white in the diagram. 
Summary of effects Noise impacts considered to be imperceptible to not significant at nearest receptors, and entirely imperceptible at more removed receptors. Temporary slight to moderate at two nearest dwellings during local berm construction (1-2 weeks). *Refers to consequence of impacts*

5.10 Glossary of Terms

Ambient — Total noise environment at a location, including all sounds present.

A-weighting — Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq\,T}$, $L_{AF10\,T}$, etc.

Background level — A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90\,T}$.

Decibel (dB) — Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels

	are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. **Throughout this report noise levels are presented as decibels relative to 20 µPa**.
Effect	Consequence of an impact.
Emissions	Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.
Fast response	0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10\,T}$, $L_{AF90\,T}$, etc.
Free field	Measurement position removed from acoustically reflective surfaces other than ground.
Frequency	Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.
Hertz (Hz)	Unit of frequency measurement.
Immissions	Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).
Impact	Change resulting from an action, such as implementation of a project.
Impulse	Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.
Interval	Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq\,T}$, $L_{AF90\,T}$, etc.
$L_{Aeq\,T}$	Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.
$L_{AF10\,T}$	Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90\,T}$	Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
Soundscape	Acoustic environment as perceived, experienced or understood by listeners, taking context into account.
Specific level	$L_{Aeq\,T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.
Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.
	In this report units are generally presented using US National Institute Of Standards & Technology guidelines.

6. AIR QUALITY, CLIMATE & CLIMATE CHANGE

This chapter of the EIAR addresses air quality and climate in the existing environment; extraction activities can potentially impact on local air quality associated with the release of dust and particulates from exhaust fumes of diesel engines (HGVs, mobile quarry plant). It assesses the significant effects that might occur on air quality and climate because of the further development of the gravel pit. The mitigation measures being implemented or proposed to be implemented are also presented.

6.1 Local Climate

The long-term weather patterns at the site reflect regional conditions affecting the south Munster area. These patterns are predominantly low fronts from the west and southwest in winter months and more settled conditions during the summer months.

The nearest synoptic station to the site, for which 30-year monthly averages is available, is located at Cork Airport, approximately 30km to the southeast of the site. The grid co-ordinates for this station are W665662. It is situated at an elevation of 154mOD, approximately 50m higher than the Ummera gravel pit. Table 6-1 gives a summary of average mean temperatures, humidity, rainfall etc. based on a 30-year period between 1981 and 2010 for Cork Airport.

Table 6-1: Climatic Data from Cork Airport Synoptic Station

Monthly & Annual Mean And Extreme Values 1981-2010													
TEMPERATURE *(degrees Celsius)*	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Year***
mean daily max.	8.2	8.3	9.9	11.8	14.4	17.0	18.7	18.5	16.5	13.2	10.3	8.5	12.9
mean daily min.	3.0	3.1	4.0	4.9	7.4	10.0	11.8	11.8	10.2	7.7	5.2	3.7	6.9
mean	5.6	5.7	6.9	8.4	10.9	13.5	15.3	15.2	13.3	10.5	7.8	6.1	9.9
absolute max.	16.1	14.0	15.7	21.2	23.6	27.5	28.7	28.0	24.7	21.4	16.2	13.8	28.7
absolute min.	-8.0	-4.7	-4.3	-2.3	-0.9	3.7	6.7	5.3	2.3	-0.9	-3.3	-7.2	-8.0
mean no. of days with air frost	4.6	4.1	1.8	1.2	0.0	0.0	0.0	0.0	0.0	0.2	1.2	3.6	16.7
mean no. of days with ground frost	12.8	11.8	9.7	7.8	2.1	0.1	0.0	0.0	0.5	2.4	7.3	11.0	65.3
RELATIVE HUMIDITY ***(%)***													
mean at 0900UTC	89.8	89.4	87.8	83.1	80.6	81.3	83.2	85.4	88.4	90.1	90.7	90.5	86.7
mean at 1500UTC	83.7	78.9	75.5	71.3	70.9	71.5	72.9	72.8	75.4	80.4	83.4	85.4	76.8
SUNSHINE ***(hours)***													
mean daily duration	1.8	2.4	3.3	5.3	6.2	5.8	5.4	5.2	4.3	3.0	2.3	1.7	3.9
greatest daily duration	8.5	10.0	11.5	13.6	15.5	16.0	15.3	14.4	11.9	10.3	8.7	7.6	16.0
mean no. of days with no sun	10.1	7.9	6.3	3.1	2.1	2.5	2.0	2.6	3.6	6.4	8.6	11.9	67.1
RAINFALL ***(mm)***													
mean monthly total	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1	1227.9
greatest daily total	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9	73.2
mean no. of days with >= 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19	204
mean no. of days with >= 1.0mm	16	13	14	11	12	10	10	11	11	15	14	15	152
mean no. of days with >= 5.0mm	9	6	5	5	5	5	5	5	5	8	7	8	73
WIND ***(knots)***													
mean monthly speed	12.1	12.0	11.6	10.3	10.1	9.4	9.0	9.0	9.4	10.7	10.9	11.6	10.5
max. gust	78	83	70	62	59	49	57	54	58	75	66	80	65.9
max. mean 10-minute speed	52	54	43	40	40	33	40	38	39	48	46	56	44.1
mean no. of days with gales	2.3	1.8	1.3	0.3	0.3	0.0	0.1	0.2	0.3	1.0	1.2	1.9	10.8
WEATHER ***(mean no. of days with..)***													
snow or sleet	3.1	3.1	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	11.3
snow lying at 0900UTC	0.7	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0
hail	1.0	1.1	1.4	1.9	0.7	0.2	0.1	0.0	0.1	0.3	0.2	0.4	7.4
thunder	0.2	0.1	0.1	0.1	0.6	0.5	0.8	0.3	0.0	0.4	0.1	0.1	3.3
fog	7.8	6.8	8.5	7.5	7.6	7.6	8.4	8.8	9.1	8.7	7.6	8.4	96.8

In addition, there is a rainfall gauge station located in Macroom (Cahirbaroule). Rainfall data is provided in Table 7-1. As shown on Table 7-1, the rainfall at the Macroom station is similar to the long-term 30-year averages for Cork Airport.

The mean annual wind speed for the site is approximately 3.6m/sec at 20m height. This is based on the ESBI wind speed maps available on the SEAI website www.seai.ie.

6.2 Air Quality in the Existing Environment

The EPA's Air Quality Index for Health (AQIH) for Ireland provides an indicator of air quality across the Country. Ummera gravel pit is located in Zone 80 of Region 6 (Rural West) and has an air-quality index of 3. The AQIH has a scale of 1 to 10, with 1 being Good air quality and 10 being Very Poor air quality. The AQIH is based on the measurement of five parameters. Table 6-2 lists the parameters and the range for Good air quality with an index score of 3.

Table 6-2: Good Air Quality Index Concentrations

Parameter	Units	Index 3 Air Quality Range
Ozone gas	µg/m^3 (8-hour mean)	67 – 100
Nitrogen dioxide gas	µg/m^3 (1-hour mean)	135 – 200
Sulphur dioxide gas	µg/m^3 (1-hour mean)	60 – 89
$PM_{2.5}$ particles	µg/m^3 (24-hour mean)	24 - 35
PM_{10} particles	µg/m^3 (24-hour mean)	34 - 50

Note
1. The highest (worse) concentration determines the air quality index.

The EPA maintain a network of ambient air quality monitoring sites across the Country, most of which are in urban environments. The closest to the site are located near Cork City. The most relevant parameter for the extractive industry are $PM_{2.5}$ particles and PM_{10} particles. Statutory Instrument No 180 of 2011 (Air Quality Standards Regulations) transposes the Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC) in Irish legislation. The current limits (to protect human health) for $PM_{2.5}$ are 25µg/m^3 (annual mean), reducing to 20µg/m^3 (annual mean) in 2020. The limits for PM_{10} are 50µg/m^3 (24-hour mean), not to be exceeded more than 35 times per year and 40 µg/m^3 (annual mean).

Generally, the levels of dust in the countryside are low (<20 mg/m^2/day). From the walkover survey of the site, there is no indication of dust deposition along the boundary vegetation. Dust monitoring has been conducted at the gravel pit at three monitoring locations – D1, D2 and D3 - using Bergerhoff dust gauges as per the German VDI 2119 Standard Method '*Measurement of Dustfall*'. D1 is located at the eastern side of the pit near house H1; D2 is located at the southern end of the site near house H2 and D3 is located near the site entrance. These are shown on Figure 6-1, with results summarised in Table 6-3.

Table 6-3: Summary of Dust Monitoring Results

Monitoring Period	D1 (mg/m^2/day)		D2 (mg/m^2/day)		D3 (mg/m^2/day)	
	Total	Inorganic	Total	Inorganic	Total	Inorganic
14 Jan to 11 Feb 2006	84	26	31	6	29	8
25 April to 24 May 2006	<5	<5	5	<5	<5	<5
25 Aug to 23 Sept 2006	91	50	131	93	---[1]	---[1]
14 May to 14 June 2007	362	152	137	80	1,380[1]	1,007[1]
04 Sept to 03 Oct 2007	153	112	50	39	119	100
04 Oct to 044 Nov 2019	10.55	7.22	14.45	5.56	94.5	62.8

Note:-
1. Sample D3 vandalised.

The emission limit value for dust deposition is 350mg/m^2/day as set by the Council for the site – refer to Condition 12 of QR01. The dust analysis evaluates the organic and inorganic fraction. It is the inorganic fraction that would originate from the extraction activities. Taking the inorganic fraction as originating from site activities, the dust deposition has varied from <5 to 152mg/m^2/day at D1; <5 to 93mg/m^2/day at D2; and from <5 to 100mg/m^2/day at D3. A higher value was recorded at D3 but is due to vandalism of the sampling container.

Dust is considered to include any solid matter emanating from the gravel pit or from plant and vehicles serving it, which is borne on the wind. Dust from a gravel pit is produced from the drying of silt and fines and the movement of vehicles through the site. The size of particulates typically ranges from 1 to 75 µm. The significant cause of dust emission and dispersion from a site is wind.

The EPA sets a total dust (soluble and insoluble) deposition limit of 350mg/m^2/day (as specified by the TA Luft Guidelines). This limit is also cited in the DofEHLG Guidelines. The inorganic (insoluble) fraction is attributed to the extraction activities, while the organic fraction is likely attributable to other factors, such as insects, dust from agricultural activities (hay / straw cutting) etc.

6.3 Air & Climate - Impact Assessment

6.3.1 Do Nothing Impact

If the further development of the gravel pit is not advanced, the site will be returned to mostly agricultural use. As such the potential for dust emissions from the site would be reduced. The potential impacts associated with air and climate will be displaced to another existing or new gravel pit.

6.3.2 Operational Phase

The principal sources of air emissions from the gravel pit, particularly suspended particulates, occurs from the following activities:

- Stripping of the topsoil/overburden.
- The front-end loader hauling gravel from the working face.
- Stockpiling of the material.
- Stockpiling of silt.
- Movement and loading of the haulage trucks.

Dust emissions arise when an operation causes particulate matter to become airborne. This airborne dust is then available to be carried downwind from the source. The amount of dust generated and emitted from a working site and the potential impact on surrounding areas varies according to the following:

- The type and quantity of material and working method.
- Climate/local meteorology and topography i.e. wind speed and direction and annual rainfall amounts / patterns.

The stripping of topsoil/overburden has the potential to cause dust emissions. The greatest potential impact will be short-term i.e. during excavation. However, topsoil/overburden in storage can be eroded by wind. Stripped soil is stored in berms along the edge of the working face. These berms vegetate naturally with grass within a relatively short time.

Silt cleaned from the settlement ponds will dry and the surface layer can be eroded by wind. As the material cleaned from the ponds is the finer fraction, it is more susceptible to wind erosion.

As the processing of the gravel uses water, dust emissions from the processing plant is not an issue. Dust emissions can arise from stockpiles or aggregate and from HGV coming / going from the site. Potential dust particles generated from these activities within the site are expected to comprise of larger dust particulates (i.e. above 30µm). The maximum distance such particulates are likely to travel is 30 to 60m. Smaller dust particles will remain airborne for longer thus dispersing over a wider area. Particulates below 30µm-diameter, and particularly below 10µm, only form a small fraction of dust emitted from gravel pits.

The non-respirable dust fractions (i.e. >10 µm) may generate an indirect impact if dust deposition outside the site boundary continues over a period of time without amelioration (e.g. staining of vegetation). Short-term impacts may occur from visible dust clouds being generated during windy dry weather events.

Respirable dust fractions (i.e. below 10µm-diameter) potentially effect respiratory and cardiovascular systems. S.I. No. 271 of 2002 relating to limit values for particulate matter in ambient air indicates a 24-hour percentile (90.4%) limit value of 50µg/m^3 PM_{10}.

Transportation of aggregates both within the site and off site has the potential to generate dust. Haulage on roadways can result in both windborne dispersion and also transfer of dust from the site. This dust nuisance may result in visual staining and soiling of nearby vegetation and buildings.

Residents of the nearest house (H1) noted nuisance dust deposition at their property in the late 1990's / early 2000's. They also noted that dust nuisance has not been an issue in recent years. The operations at the pit have not changed in any significant way, so it is not clear why this is the case; the sprinkler system was installed in the late 1990's following complaints. It may be that as trees matured along the western boundary of the gravel pit, they protected the site from the prevailing wind direction. Plate 6-1 shows the gravel pit in 2005 (Summer) and 2020 (Winter) viewed from the west. Although taken in Winter with no foliage on the trees, it is evident that they provide greater shelter from the wind.

Plate 6-1: View of Gravel Pit from West – a) 2005 and b) 2020

6.4 Air & Climate –Mitigation Measures

Several dust suppression mitigation measures have been employed at the gravel pit. These are as follows:

- The processing of aggregate is a wet process, so dust doesn't arise from the fixed plant.
- Stripped soil is stored at the top edge of the working face. These temporary berms are allowed to vegetate naturally, which reduces potential for wind erosion. The berms also shelter the working areas from wind.
- Trees were planted along the western boundary of the site. As these trees matured, they provide visual screening of the site and shelter from the predominant wind direction. In addition, mature trees at the southwest corner and northern boundary have been maintained.
- Silt cleaned from the silt ponds will be seeded with grass to limit the potential for wind erosion.
- A speed limit of 15kph is enforced at the site for all HGV.
- A dust monitoring programme has been implemented at the site.

- The access road into the gravel pit is currently unpaved. This road will be paved from the public road to the yard area. The road will be kept clean, so will not be a source of dust emissions. With this road paved, it is less likely that soil would be tracked onto the public road, which would give to off-site dust emissions.

It is noted that the Macroom area is subject to high rainfall. The long term (30-year average) monthly rainfall for this area of Cork is approximately 1,200mm. The high level of rainfall will naturally suppress dust emissions from the gravel pit. As noted in Table 6-1, Cork Airport has 152 days per year with greater than 1mm rainfall.

6.5 Conclusion on Air and Climate

Strict adherence to operational procedures incorporating best practice will ensure dust migration from the site will be minimised. The topographical and local climatic factors will result in the majority of airborne dust generated at the site being deposited within the site boundary. In addition, the environmental monitoring programme will highlight elevated dust emissions so that mitigation measures can be reviewed, or new ones introduced for the further development of the gravel pit.

Figure 6-1: Dust Monitoring Location Map

7. HYRDOLOGY & SURFACE WATER

This chapter of the EIAR addresses hydrology and surface water in the existing environment. It assesses the significant effects on hydrology and surface water environments that could result from the further development of the gravel extraction activities. The mitigation measures proposed to be implemented to avoid, reduce and mitigate the impacts identified are also presented.

7.1 Existing Environment

The landholding is located within the South Western River Basin Management District and within Hydrometric Area No 19 – Lee, Cork Harbour and Youghal Bay. Hydrometric Area No 19 includes the surface catchment drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy, Battery, Co. Cork.

The gravel pit is located in the IE_SW_Laney_040 Water Management Unit, and within the catchment of the Clashavoon Stream – refer to Figure 7-1. This catchment extends to an area of 15.6km^2. The Clashavoon Stream rises in Derryroe, approximately 3km to the north of Ummera. It flows in a southerly direction and is joined by a number of smaller streams, including one (Curraghanearla Stream) that joins just north of the gravel pit. The Clashavoon Stream joins with the Laney River near the southwestern corner of the landholding. The Laney River flows southwest just west of local road L-3423. It joins with the Sullane River near Bealick Mills. The confluence of the Sullane River with the River Lee is located approximately 3km to the south of Ummera at Coolcour. This waterbody has an overall 'High' river waterbody status and is classified by the WDF as 'not at risk'.

There are no designated sites within the vicinity of the site which could be in hydraulic connection with the gravel pit. The closest downstream sites are the Lee Valley pNHA (downstream of Inniscarra Dam) and the Great Island Channel SAC, approximately 40km to the east of Ummera.

Drainage from the landholding is generally in a westerly direction towards the Clashavoon Stream and Laney River. Local site drainage and surface water features are shown on Figure 7-2 and consists of:

- The Curraghanearla Stream flows east to west forming the north-eastern landownership boundary.
- The Curraghanearla Stream joins the Clashavoon Stream at the northern landownership boundary. The Clashavoon Stream flows in a southerly direction forming the north-western and western landownership boundary. Near the south-western corner of the landownership, the Clashovoon Stream joins the Laney River.
- Rainwater runoff from the eastern side of gravel pit yard flows into the settlement ponds and is recirculated for washing gravel.
- Rainwater runoff from the western side of gravel pit yard (and overflow from settlement ponds) passes through an overflow settlement pond and flows to the roadside drain along the site access road and to the roadside drain on the L-3423.
- Groundwater springs in the southern section of the extraction area flow across the site, infiltrate back into the gravel or flow through a series of small ponds before exiting the site to the roadside drain on the L-3423 just south of the site entrance.
- The L3423 roadside drain is culverted under the L-3423 into a small densely vegetated swale. The swale is approximately 65m long and discharges to the Laney River.
- A small stream flows north from the elevated farmland to the south of the gravel pit. It flows through the old farmyard at the south-western corner of the landholding and then follows the property boundary under the L-3423, discharging to the Laney River.

7.1.1 Runoff Estimates

The nearest synoptic weather station to the site is Cork Airport (W665662), 30km to the southeast of the site at an elevation of 154mOD. The mean monthly rainfall for Cork Airport synoptic station is summarised in Table 7-1. The long-term average rainfall for Cork Airport is 1,227.9 mm/annum for 1981 to 2010. An extreme rainfall event of 73.2mm/day was recorded during the 30-year period 1981 to 2010. The nearest rain gauge station is located at Macroom (Cahirbaroule) 4km to the north, at an elevation of 165mOD. The station has been operational since 2013. Monthly totals for 2017 and 2018 are also provided in Table 7-1. The lower elevation of the site suggests that annual rainfall would be in region of 1,200mm, which is in accordance with the rainfall isopleths map prepared by Met Eireann.

Table 7-1: **Monthly and Annual Average Rainfalls (mm)**

Cork Airport													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
1961 - 1990	148	116	97	70	84	68	65	90	97	126	109	137	**1,207**
1981 - 2010	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120	133.1	**1,227.9**
Greatest Daily Total – Cork Airport													
1981 - 2010	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9	**73.2**
Macroom (Cahirbaroule)													
2017	97.9	132.3	121.3	21.2	71.1	113.1	99.7	78.6	144	133	107.2	155.9	**1,275.3**
2018	225.8	86.4	143.2	189	75.4	32.5	40.7	31.8	---	76.2	233.3	271.1	**---**

There was no rainfall depth recorded for September 2018 and data recorded for only 6 months in 2019. The catchment characteristics are quantified as soil type 2 (good winter rain acceptance potential). The runoff co-efficient of the site is estimated at 0.37. The potential for soakage is good in these gravel deposits. Based on the mean annual rainfall for the Ummera area, the incident rainfall on the 20.22ha landholding is approximately 242,640m^3 per annum.

7.1.2 Surface Water Quality

There are a number EPA surface-water monitoring stations on the Sullane River and its tributaries. The closest one downstream of the gravel pit is on the Laney River, just upstream of its confluence with the Sullane River – refer to Figure 7-1. The 2018 EPA Q-value for this location is Q4-5, indicating high water quality status. The other EPA monitoring station on the Laney River is upstream of the Clashavoon Stream confluence. It too has a 2018 Q-value of Q4-5, indicating that the operations at the gravel pit are not impacting water quality in the intervening river section.

To determine the water quality of the Clashavoon Stream adjacent to the gravel pit three surface water samples (SW1 to SW3) were collected, as follows:

- SW1: Clashavoon Stream, upstream of gravel pit.
- SW2: Clashavoon Stream, downstream of original settlement ponds at bridge.
- SW3; Laney River, downstream of gravel pit and downstream of drain discharge to river.

Samples were collected on 28 May, 02 July and 05 November 2019. The surface water samples were analysed for a suite of parameters. The results are summaried in Table 7-2. Sample points are shown on Figure 7-2.

Table 7-2: Summary of Surface Water Sample Results

Parameter	Units	Sample ID								
		SW1			SW2			SW3		
		28/5/'19	02/7/'19	5/11/'19	28/5/'19	02/7/'19	5/11/'19	28/05/'19	02/7/'19	5/11/'19
Ammonia (NH3)	mg/l, N	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	mg/l, N	5.1	5.56	3.63	5.2	5.56	3.77	2.3	2.4	2.41
Nitrite	mg/l, N	0.008	---	0.017	0.002	---	0.0173	0.003	---	<0.0152
Orthophosphate	mg/l, P	<0.1	<0.1	0.0294	<0.1	<0.1	0.03	<0.1	<0.02	<0.02
Orthophosphate	mg/l, PO_4	---	0.108	---	---	<0.1	---	---	<0.1	---
BOD	mg/l	<4	<1	1.15	<4	<1	1.18	<4	<1	1.4
DO	O_2 (mg/l)	10.05	---	10.6	10.22	---	10.9	10.27	---	10.6
TSS	mg/l	<10	<2	<2	18	<2	<2	16	<2	2.45
pH	pH Units	7.41	---	7.67	7.2	---	7.68	7.38	---	7.43
Total Nitrogen	mg/l, N	5.55	---	4.03	5.69	---	4.15	2.88	---	2.62
Total Phosphorous	mg/l, P	<0.1	---	0.0556	<0.1	---	0.0574	<0.1	---	0.0393

The Clashavoon Stream has 'High' water quality status (WFD Status 2010-2015) with the objective of maintaining this water quality status. It is not classified as being 'At Risk'. The following surface water quality limits apply:

1. BOD
    a. Good Status river waterbody - <2.6mg/l (95%tile). There is no limit for moderate status.
2. Ammonia
    a. Good Status river waterbody - <0.140mg/l (95%tile)
3. Orthophosphate
    a. High Status river waterbody - <0.045mg/l (95%tile)
    b. Good Status river waterbody - <0.075mg/l (95%tile)
4. Dissolved Oxygen
    a. Lower Limit – 95%ile >80% saturation
    b. Upper Limit – 95%ile <120 saturation
5. pH
    a. Soft Water 4.5 < pH <9.0
    b. Hard Water 6.0 < pH < 9.0

The results collected indicate that the Clashavoon Stream has good water quality, as indicated by the results for SW1 and SW3.

The main parameter of interest from the extraction activities is suspended solids. The results indicate that the site activities are not impacting on water quality at the time of sampling. The suspended solids concentration at the downgradient sample locations range from is <2mg/l to 18mg/l.

7.1.3 Surface Water Usage

The immediate area around the site is not serviced by mains water. Private wells are used for domestic and agricultural demands. Cork County Council has a drinking water abstraction point on the River Lee at the Inniscarra Dam, approximately 18km downstream of the site. There are no known private abstraction points downstream of the site.

The gravel pit extracts water from the Clashavoon Stream for use at the washing plant. This water is recirculated through the settlement ponds. There are two hydrometric gauging stations on the streams and rivers draining the site - http://gis.epa.ie/Envision; one is located on the River Laney upstream of its confluence with the Clashavoon Stream (station name Kill) at co-ordinates 136400 / 74300; the other on the Sullane River, upstream of its confluence with the Laney River (station name Macroom). The recorder gauging station on the Laney River is just upstream of the confluence with the Clashavoon Stream. The dry weather flow at this gauging station is reported as 0.12m^3/sec and the 95%tile flow is 0.27m^3/sec. The catchment area is 84.3km^2, giving a specific dry weather flow and 95%tile flow of 1.4 and 3.2 litres per second per km^2 of catchment. The catchment of the Clashavoon Stream at the pump intake is approximately 12km^2. This gives an estimated dry weather flow and 95%tile flow of 17 litres/sec and 38.4litres/sec, respectively.

Using the online EPA Hydrotool, the 95%tile flow for the Clashavoon Stream (to its confluence with the Laney River) is 0.033m^3/sec for its 11.2km^2 catchment. This is in line with the estimates from the Laney River gauging station. The Hydrotool report is provided in Appendix 7-1.

As discussed in Chapter 2, the settlement ponds have a capacity of approximately 14,970m^3 following cleaning (removal of silt). This capacity decreases over time as the ponds fill with silt. In dry periods, water will be lost through wetting of aggregate, infiltration and evaporation. Over the course of a working day, approximately 800m^3 of water is used. Assuming a 5% loss, 40m^3 of top-up water would need to be abstracted from the Clashavoon Stream. This would equate to 2.7% of the dry weather flow over a 24-hour period.

It is noted that topping up would only be required when the level in the last pond was too low to pump. Assuming losses of 40m^3/day, the capacity in that pond would allow for over approximately 100 days without top-up. In this time, rainfall would naturally top up the ponds and / or abstraction could be timed during high flows in the stream.

7.1.4 Flooding

The site does not flood. It is not located within the flood zones as shown in the Macroom LAP (2017). Some parts of the L-3423 and L7478 are shown as being susceptible to flooding, but this does not impact on the gravel pit. Flooding extent is shown on Plate 7-1.

Plate 7-1: Flooding Extent for Clashavoon Stream & Laney River
Source – Cork County Council Macroom LAP 2017
Flood Zone A extent shown blue
Flood Zone B extent shown magenta

7.2 Impact Assessment

7.2.1 Do Nothing Impact

If the further development of the gravel pit is not advanced, the site will be returned to mostly agricultural use. Surface water runoff would return to greenfield rates and volumes. The risks to surface water quality would transition from those associated with extraction activities to those associated with agriculture.

7.2.2 Worst-Case Scenario

The worst-case scenario would be a release of a large volume of silt-laden water into the Clashavoon Stream. This would have a temporary moderate direct negative impact on water quality; suspended solids concentrations would dilute as the plume moved downstream and solids would settle in the low energy environments in the Lee Reservoir. There would be a short to medium term indirect negative impact on aquatic ecology. The risk of this occurring is very low as a number of avoidance and remedial measures have been introduced to manage washwater.

7.2.3 Operational Phase

As noted, the area is not serviced by mains water. Each dwelling uses a bored well for water supply. There are no wells downgradient of the gravel pit with respect to groundwater flow direction (interpreted to be to the west and southwest to the Clashavoon Stream and Laney River). Excavations have not interfered with private supply wells near the gravel pit. Excavations have encountered groundwater springs, but there is no indication that this has affected the supply wells near the gravel pit; this is discussed further in Chapter 8.

Much of the incident rainfall on the site will infiltrate into the gravel deposits. However, surface water runoff from the site does occur. The activities and processes that will occur with the further development of the gravel pit and that could potentially impact upon surface water are as follows:

- Since the installation of the washing plant, water has been abstracted from the Clashavoon Stream. A small weir has been created with boulders at the abstraction point to maintain water depth for the pump intake. This creates a small backwater upstream of the weir and creates an obstruction to the clear passage of fish.
- Storm water runoff from exposed soils and stockpiles with subsequent sediment loading of the site drains. This is occurring also for runoff from the site access road which is unpaved.
- Groundwater springs are encountered at the gravel pit. These are interpreted to be perched groundwater on low permeability layers found within the gravel deposit – refer to Chapter 8. When flowing (in winter months), these increase the surface water discharge from the gravel pit.
- The storage and use of diesel and hydrocarbons on site present a risk to surface water quality. No pollution incidents associated with hydrocarbons has occurred at the gravel pit, but its use and storage present a risk.

7.3 Mitigation Measures

The following measures are employed at the gravel to avoid and / or mitigate potential impacts on the surface water environment:

1. As discussed in Chapter 2, the settlement ponds have been improved to recirculate wash water with the site proper; the original settlement pond located between the L-3423 and Clashavoon Stream is no longer used.
2. An addition surface water settlement pond has been created to treat runoff from the western yard area and overflow from the settlement ponds when inflow from rainfall runoff occurs.
3. The improvement in the recirculation of wash water has limited the volume of water abstracted from the Clashavoon Stream.
4. Hydrocarbons are stored in a self-bunded above-ground storage tank.
5. Domestic wastewater is treated with an on-site septic tank and percolation system.
6. The flows from springs is directed through the site to avoid trafficked areas. This will keep this water clean as it discharges from the site.

Addition mitigation measures are proposed to improve the surface water management at the gravel pit and to avoid / reduce impacts that might occur:

1. A concrete refuelling pad will be installed which will contain any spills during refuelling.
2. The storage of fuel and hydrocarbons will be improved. This will include the construction of a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
3. Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
4. A spill kit will be kept in the front-end loader.
5. The access road into the site will be paved as far as the yard area. This will incorporate a concrete channel for roadside drainage. The access road will be kept clean, so runoff of silt-laden water doesn't occur.
6. Due to the low throughput, the septic tank and percolation area will be replaced with a sealed 2.2m^3 underground tank which will be emptied by a licensed contractor.
7. Surface water monitoring will be carried out as detailed in Section 2.4.

7.4 Conclusions

Surface water management has been improved in recent years to minimise the risk of polluting the Clashavoon Stream. Runoff water from the gravel pit is treated in the on-site settlement ponds prior to recirculation or discharge from site. Additional improvements are proposed to further reduce the risk to the receiving waters. Surface water management will be kept under review during the further development of the gravel pit and improvements made when necessary. Runoff rates and volumes will return to near greenfield conditions with the restoration of the site to agricultural land use.

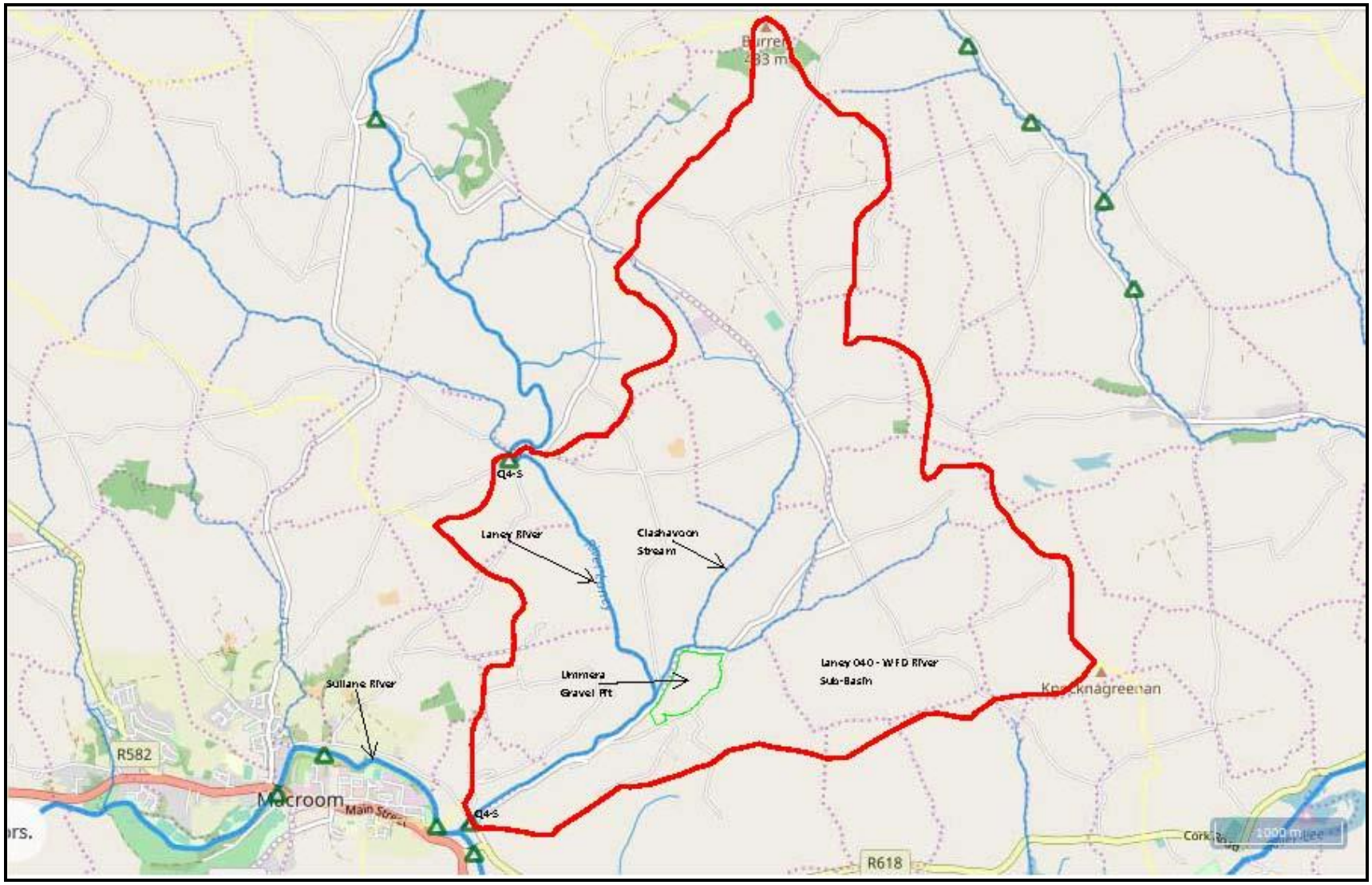


Figure 7-1: Catchment of Laney 040 - WFD River Sub-Basin

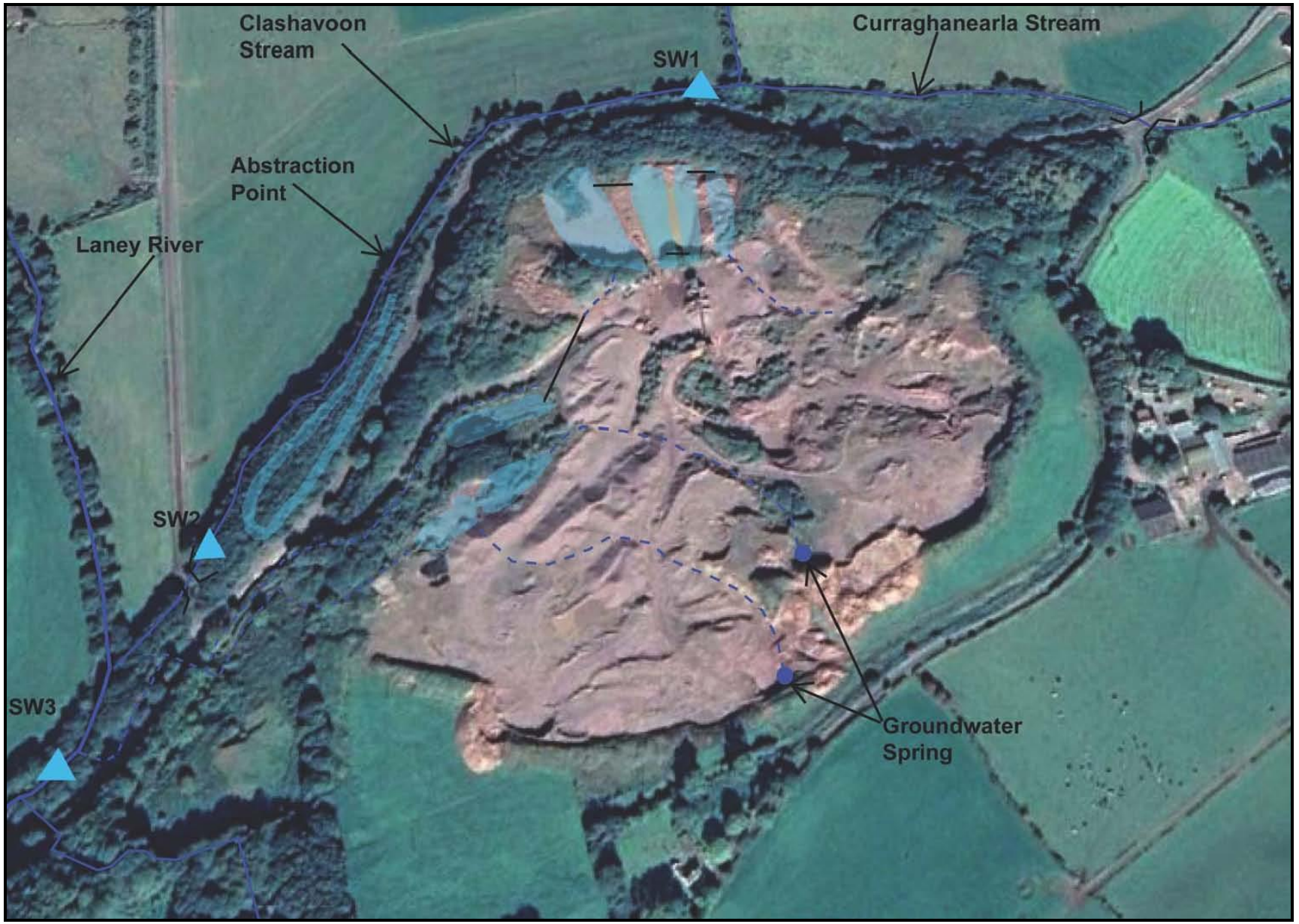


Figure 7-2: Local Surface Water Drainage

8. SOILS, GEOLOGY & HYDROGEOLOGY

This chapter of the EIAR addresses geology and hydrogeology in the existing environment. It assesses the significant effects on the geological / hydrogeological environment that could result from the further development of the gravel extraction activities. The mitigation measures proposed to be implemented to avoid, reduce and mitigate the impacts identified are also presented.

8.1 Methodology

The assessment of the impacts on geology and hydrogeology involved:

1. Desk study, including a review of available published literature.
2. Collection of data from Government departments including the Geological Survey of Ireland (GSI).
3. Site walkover.
4. Monitoring of water levels at site boreholes and neighbouring wells.

The assessment was prepared having regard to the Institute of Geologists of Ireland guidelines[15].

The literature reviewed as part of the desk study included:

1. Geology of Kerry-Cork, Geological Survey of Ireland (GSI), 1997[16].
2. Soils Association of Ireland and their Land Use Potential, M. J. Gardiner and T. Radford, National Soil Survey of Ireland, 1980[17].
3. Directory of Active Quarries, Pits, and Mines in Ireland, GSI 2014[18].
4. 2014 Cork County Development Plan.
5. Memoir of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland, The Mining Heritage Society of Ireland, 1998[19].
6. Original 6-inch field mapping sheets – www.gsi.ie .
7. Geophysical Survey to Estimate Sand & Gravel Reserves at Ummera, Macroom Co Cork[20].

Walkover surveys took place on several occasions throughout 2019 to supplement walkover surveys carried out previously at the gravel pit. During the site walkovers, inspections were conducted of the exposed faces of the gravel pit and measurements made of groundwater levels at site boreholes and at neighbouring wells.

8.2 Existing Geology

The geology at the site is established based on available published literature, files/records made available from the GSI, GSI online web-mapping and site walkover.

8.2.1 Overburden Geology

The soils of the site are mapped as Brown Podzolics within the Rolling Lowland physiographic division. These typically comprise 60% brown podzolics, 20% acid brown earths and 20% gleys. The parent material is sandstone and Lower Avonian shale glacial tills. This soil association makes up 6.31% of the country, mostly occurring in mid, south and east County Cork.

The detail subsoil mapping for the area is taken from the GSI web-mapping. The area is dominated by tills and gravels deposited during glaciation and alluvium and peat deposited/developed post glaciation. Elevated ground in the area is mapped as having bedrock at / near ground surface.

There is evidence of at least two glaciations affecting the southwest of Ireland during the Pleistocene Epoch (1.6M years – 10,000 years ago). During the last glaciation, ice was centred to the south of the MacGillycuddy Reeks and extended radially outwards. Glaciation that affected the Macroom area resulted in ice movement eastwards from the Reeks. This resulted in the creation of glacial features such as roches moutonnees, corries and meltwater channels.

The sediments deposited from the glaciers and its meltwaters are tills and gravels. Tills derived chiefly from Devonian sandstones (TDSs) dominate the wider area. Glaciofluvial sands and gravel (GDSs) occur at the Ummera pit and predominately in the valleys of the Lee and Laney rivers. Isolated pockets of fen peat (FenPt) and blanket peat (BkPt) deposits occur scattered throughout the wider area. Geophysical survey carried out in 2003 interprets 10 to 15m of sand/gravel in the central area of the landholding, thinning to <5m towards the southern boundary. The overburden geology is of the area is shown in Figure 8-1.

8.2.2 Bedrock Geology

The geology of this area is taken from the Geological Survey of Ireland (GSI) report – Geology of Kerry-Cork (GSI, 1997). This area of County Cork is underlain by the Devonian and Carboniferous-aged rocks belonging to the Old Red Sandstone Magnafacies. This magnafacies has been subdivided into a number of regions with different stratigraphic successions. The Ummera site straddles two regions; Central Cork succession on the southern and eastern parts of the site and the Southern Derrynasaggart Mountains succession at the northern part of the site (under the settlement lagoons). The bedrock formations represented by these successions is summarised in Table 8-1. Bedrock geology is shown on Figure 8-2.

Table 8-1: Summary of Bedrock Geology in Macroom Area

Southern Derrynasaggart Mountains Succession	**Central Cork Succession**
Toe Head Formation [cross-bedded sandstone & mudstone]	Gyleen Formation [red siltstone and subsidiary sandstone]
Castlehaven Formation [purple mudstone, siltstone, sandstone	
Gun Point Formation [green sandstone and purple sandstone]	Ballytrasna Formation [dusky-red to purple mudstones with subordinate pale-red sandstones]
Caha Mountain Formation [purple and green siltstones and sandstones]	
Gortanimill Formation [green sandstone and purple siltstone]	
Slaheny Sandstone Formation [cross-bedded sandstone & siltstone]	
Bird Hill Formation [purple sandstone & siltstone]	Gortanimill Formation [green sandstone and purple siltstone]

The bedrock formation underlying most of the gravel pit is the Ballytrasna Formation of the Central Cork Succession. The Ballytrasna Formation is Devonian in age. It is characterised by dusky-red to purple coloured mudstone and siltstone with subordinate fine-grained pale-red sandstones. The formation varies in thickness from 360m to 1,500m. No bedrock outcrop has been observed on the site.

The north-western part of the site is underlain by the Caha Mountain Formation. The Caha Mountain Formation is Devonian in age. It consists of purple siltstones and fine-grained parallel and cross-laminated sandstones. It is 2,150m thick at its type location near Glengarriff.

Following deposition, the bedrock was uplifted and compressed during the Variscan Orogeny resulting in the folding and faulting seen today. This is dominated by northeast-southwest trending anticlines and synclines.

8.2.3 Economic Geology

The aggregate at the gravel pit is used primarily in the manufacture of concrete at DCWL's facility at Bredagh Cross, Drimoleague. It is tested for its suitability of use in these concrete products. It is also purchased by third parties for other uses.

According to the Directory of Active Quarries, Pits and Mines in Ireland, there no active quarries / gravel pits within the immediate vicinity of the site. A small number of old gravel workings are located within approximately 1km of the pit. There are a number of gravel pits to the east of Ummera along the Bride River valley, just west of Ballincollig. There is no history of mining within the site or within the immediate vicinity of the site.

8.2.4 Geological Heritage Sites

In conjunction with the National Parks and Wildlife Service (NPWS), the GSI has been identifying sites of geological interest (geological heritage sites) across the Country since 1998. Sites are being categorised under 16 geological themes, such as economic geology, karst, Devonian, coastal, Quaternary, etc. These sites are being designated as Natural Heritage Areas or of importance at a County level. Cork County Council has developed a list of sites of geological interest for inclusion in the 2014 County Development Plan. It is an objective of the County Development Plan (Objective HE 2-6) to:

> '*Maintain the conservation value of those features of areas of geological interest that are listed in Volume 2, Chapter 3 Nature Conservation Areas, of the plan, and to protect them from inappropriate development'*.

Table 3-8 of Volume 2 of the County Development Plan lists 103 sites of geological interest in County Cork. The GSI was contacted for information on the nearest sites to the gravel pit. The closest is The Gearagh on the River Lee, approximately 8km to the southwest. It is designated under the 'Fluvial and Lacustrine Geomorphology' theme for its unique part of a formerly much larger floodplain with a forested anastomosing channel system.

The gravel pit itself is not listed as being an Area of Geological Interest. All of these sites are greater than 5km from the gravel pit and there is no connectivity. As such the development has not and will not have any direct or indirect impact on geological heritage sites.

8.2.5 Existing Hydrogeology

The Caha Mountain Formation underlying the north-western part of the site is classified by the GSI as PL – Poor Aquifer, bedrock which is generally unproductive except for local zones. The Ballytrasna Formation is classified by the GSI as LI - Locally Important Aquifer - bedrock which is moderately productive only in local zones. The gravels underlying the site are not classified as an aquifer. Groundwater springs have been encountered during excavations. These are interpreted to be perched water table siting on low permeability silts and clays encountered in the deposits. Bedrock aquifers are shown on Figure 8-3.

According to the GSI web-mapping, there are no wells within 500m of the gravel pit. The closest are located approximately 700m to the north of the gravel pit in Shanakill. Wells included in the GSI database are shown on Figure 8-3. These wells are used for domestic supply with yields in the range of 20 to 45m^3/day.

The GSI well database is not comprehensive as not all boreholes drilled are reported to them. A door-to-door survey identified six wells near the gravel pit. Details of wells identified are summarised on Table 8-2.

Depth to groundwater was measured in the four bored wells at neighbouring dwellings – houses H1 to H4 (well numbers correspond to house numbers used on Figure 2-1). The other wells identified are too distant from the gravel pit and separated by hydraulic barriers so can't be impacted by activities at the gravel pit. Three shallow boreholes were installed at the pit to measure groundwater levels. Wells are shown on Figure 8-5.

Table 8-2: Summary of On-Site + Neighbouring Wells

Well ID	Total Depth (m)	Depth to GW (m)	Top of Well Liner Elev. (mOD)	GW Elev. (mOD)	Comments
W1	36.4	4.2	114.81	110.61	serves H1 and farm
W2	90.1	0.14	108.14	108.00	serves H2
W3	17.4	1.31	122.86	121.55	serves H1 and farm
W4	>45	12.81	NM	~81.19	serves H4
W12	NM	NM	NM	NM	serves H10, H11 and H12 and farm
W13	NM	NM	NM	NM	serves H13
BH1	5.98	5.05	93.60	88.55	In yard – dry after installation
BH2	3.85	1.08	85.95	84.87	near site entrance
BH3	2.69	2.14	98.13	95.99	south end of extraction area

Note:
1. The measuring point for neighbouring supply wells is the top of the steel liner.
2. The measuring point for on-site boreholes is the top of the black HDPE casing.

Groundwater flow direction is this area is interpreted to be to the west - southwest, with discharge to the Clashavoon Stream. The groundwater levels and interpreted groundwater flow are shown on Figure 8-5.

8.2.6 Groundwater Usage

The area is not serviced by mains water. Houses and farms near the gravel pit use bored / dug wells for drinking water supply. The GSI database doesn't show any wells within approximately 700m of the gravel pit (refer to Figure 8-4), however, additional wells were identified during door-to-door surveys – refer to Table 8-2 and Figure 8-5.

There are no drinking water protection zones in the vicinity of the site. The closest is the Coachford public supply (consisting of two bored wells), approximately 8km to the east of the gravel pit. There is no hydrological connection between the gravel pit and the Coachford supply wells.

8.2.7 Groundwater Vulnerability

The groundwater vulnerability at the gravel pit is mapped by GSI as High. For soils with high permeability, such as sand and gravels, this indicates thicknesses of greater than 3m – refer to GSI Groundwater Protection Schemes[21]. Aquifer vulnerability is shown on Figure 8-6.

8.2.8 Groundwater Quality

Groundwater was not monitored as part of the assessment. The site is located in the Ballinhassig West Groundwater Body. This groundwater body is rated as having 'Good' status for 2010-2015 under the water framework directive.

8.3 Impact Assessment

8.3.1 Do Nothing Impact

If the further development of the gravel pit is not advanced, the site will be returned to mostly agricultural use sooner than it otherwise would be. The aggregates won at the Ummera site would need to be sourced from another gravel pit.

8.3.2 Worst-Case Scenario

The worst-case scenario would be if the further development were not permitted and the gravel resource was left in the ground. This would necessitate the development of another gravel pit, possibly a greenfield site.

8.3.3 Operational Phase

The working of the gravel pit has resulted in the stripping of topsoil and subsoil with the removal of sand and gravel for beneficial use over a footprint area of the gravel pit. This will be increased with the further development of the gravel pit. The depth of gravel removed during the earlier periods of extraction can only be estimated at between 5 and 10m as no topographical survey is available prior to 2007. The pit faces will be up to approximately 10m high at the highest parts. The rate of extraction in recent years is approximately 50,000 tonnes per annum and this rate is expected to continue during the further development of the gravel pit. Over an expected timespan of further development, approximately 750,000 tonnes will be removed. The removal of the sand & gravel is a permanent direct impact. The stripping of the overburden and topsoil is a long-term direct, but reversible, impact with the future restoration of the site.

The removal of subsoil and gravels has resulted in an increased vulnerability of the underlying bedrock aquifer. The area is rated as having a High aquifer vulnerability, and although the vulnerability ranking may not have increased, the absolute vulnerability has increased over the footprint of the extraction area and will increase in the further development areas. This is a permanent direct negative impact.

The use of the on-site mobile plant has required on-site storage of diesel and refuelling. There is the potential for diesel to leak or spill, contaminating the underlying soils and groundwater. However, no diesel spillage at the site have been recorded, so impact to soil or groundwater quality has not occurred. The continued storage of diesel at the site, and the refuelling of site plant on an unpaved yard area, does however present an on-going risk.

While groundwater springs have been encountered at the gravel pit, the measurement of groundwater levels at the three nearest upgradient wells (two of which are adjacent to the gravel pit) doesn't indicate that these supply wells have been affected. There is no groundwater abstraction at the gravel pit.

8.4 Mitigation Measures

The impacts on the soils, geology and hydrogeology cannot be remedied by avoidance. Reduction and remedy measures are employed, and will continue to be employed, to limit the impacts. These include:

1. Stripped topsoil and overburden are used on site for long-term and temporary screening berms. In the long-term, stripped topsoil / overburden and silts generated from the washing process will be used in site restoration.
2. To mitigate the risk of fuel spillage to the environment, diesel is stored in a self-bunded fuel storage tank.
3. Surface water is recirculated from the on-site settlement ponds in a closed system, topped up by runoff water from the pit floor and water abstracted from Clashavoon Stream. There is no groundwater abstraction.

Additional mitigation measures are proposed for the further development of the gravel pit to improve the geology / hydrogeology environment and to avoid / reduce impacts that might occur:

1. A concrete refuelling pad will be installed which will contain any spills during refuelling.
2. The storage of fuel and hydrocarbons will be improved. This will include the construction of a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
3. Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
4. Restoration of worked out areas of the gravel pit will commence to reduce the area of exposed soils and reduce aquifer vulnerability.
5. The nearby groundwater supply wells will be monitored during the operation of the gravel pit (refer to Section 2.4). If it is determined that the gravel pit has a negative impact on the groundwater wells, a replacement water source will be provided.

8.5 Conclusions

The removal of gravel from the site has been ongoing since the 1940's. The recent rate of extraction is approximately 50,000 tonnes per annum and a similar rate of extraction is expected over the remaining lifespan of the gravel pit, resulting in the extraction of approximately 750,000 tonnes. The gravel will be put to beneficial use in the construction industry. The increased aquifer vulnerability will be mitigated with the restoration of the gravel pit and its return to agricultural land use.

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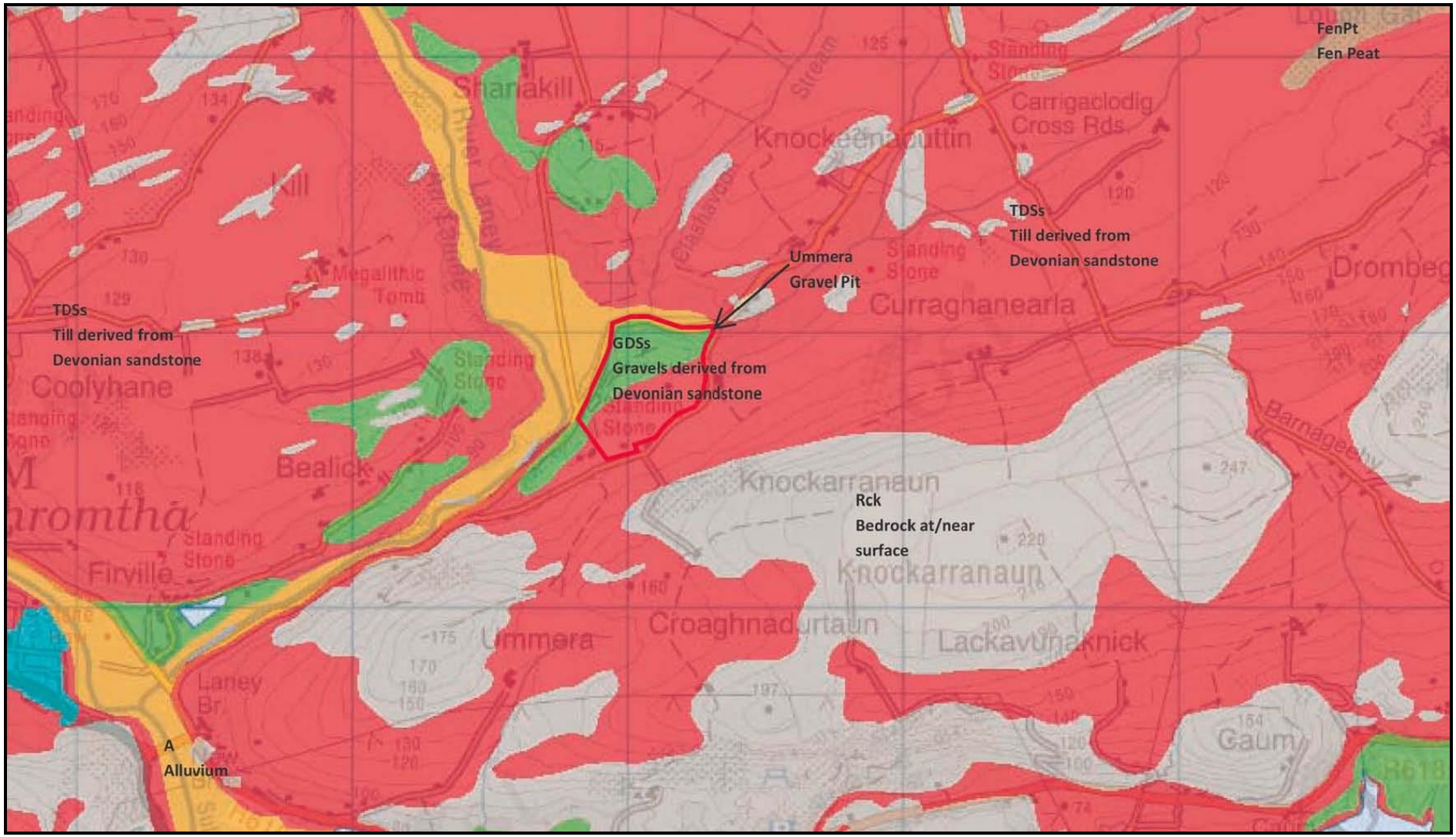

Figure 8-1: Overburden Geology Map

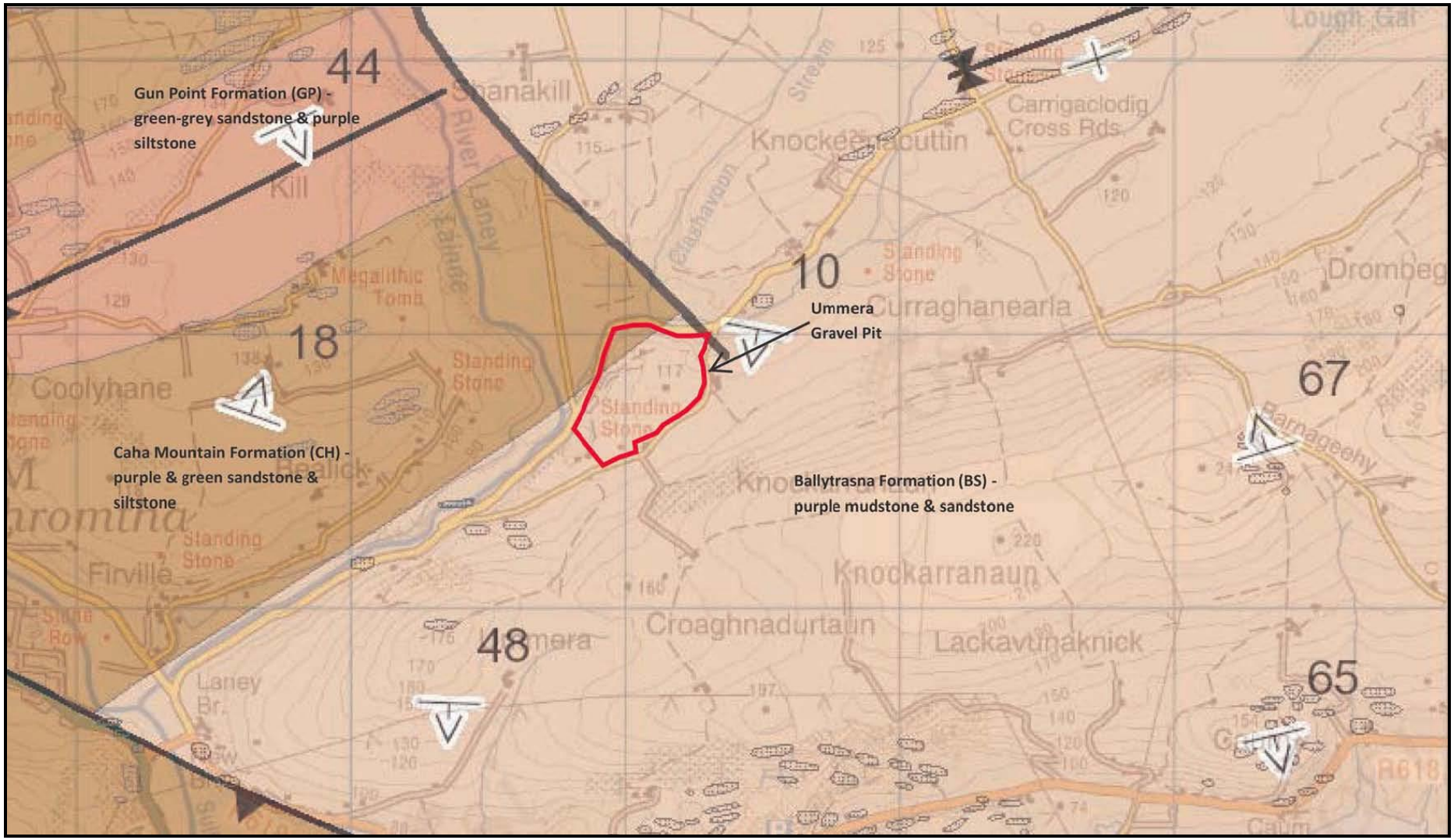

Figure 8-2: Bedrock Geology Map

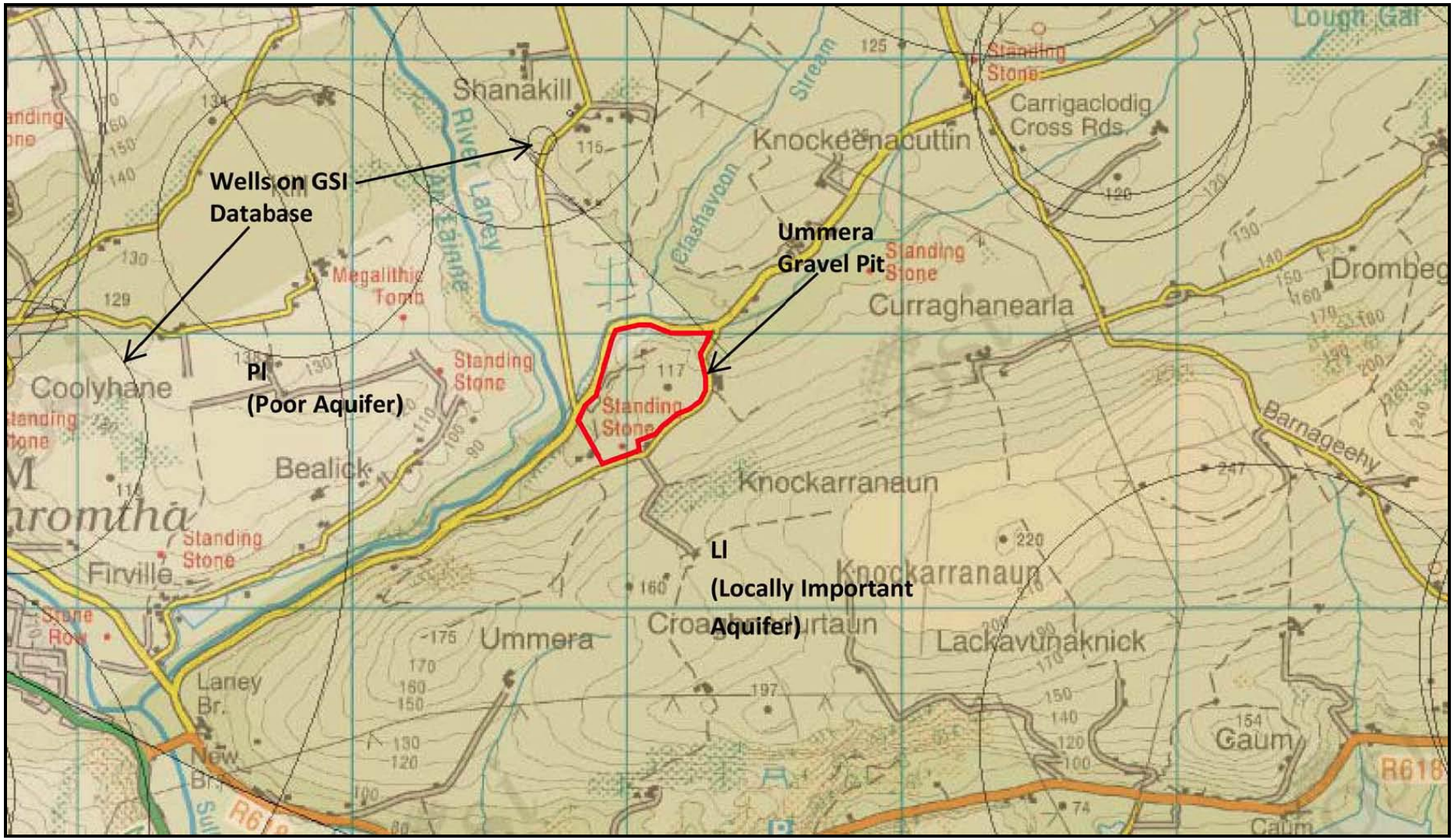

Figure 8-3: Bedrock Aquifer Map

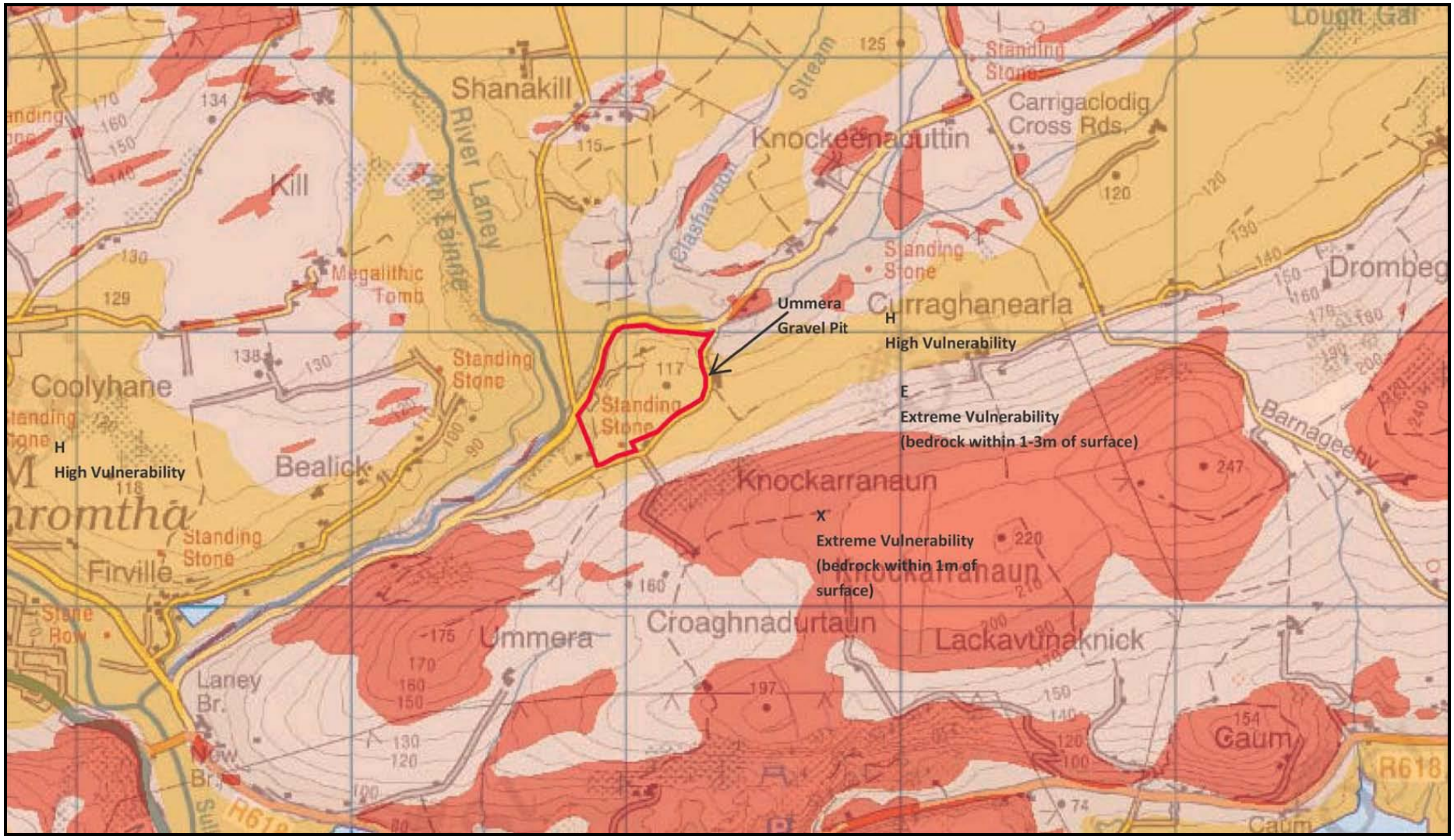

Figure 8-4: Aquifer Vulnerability Map

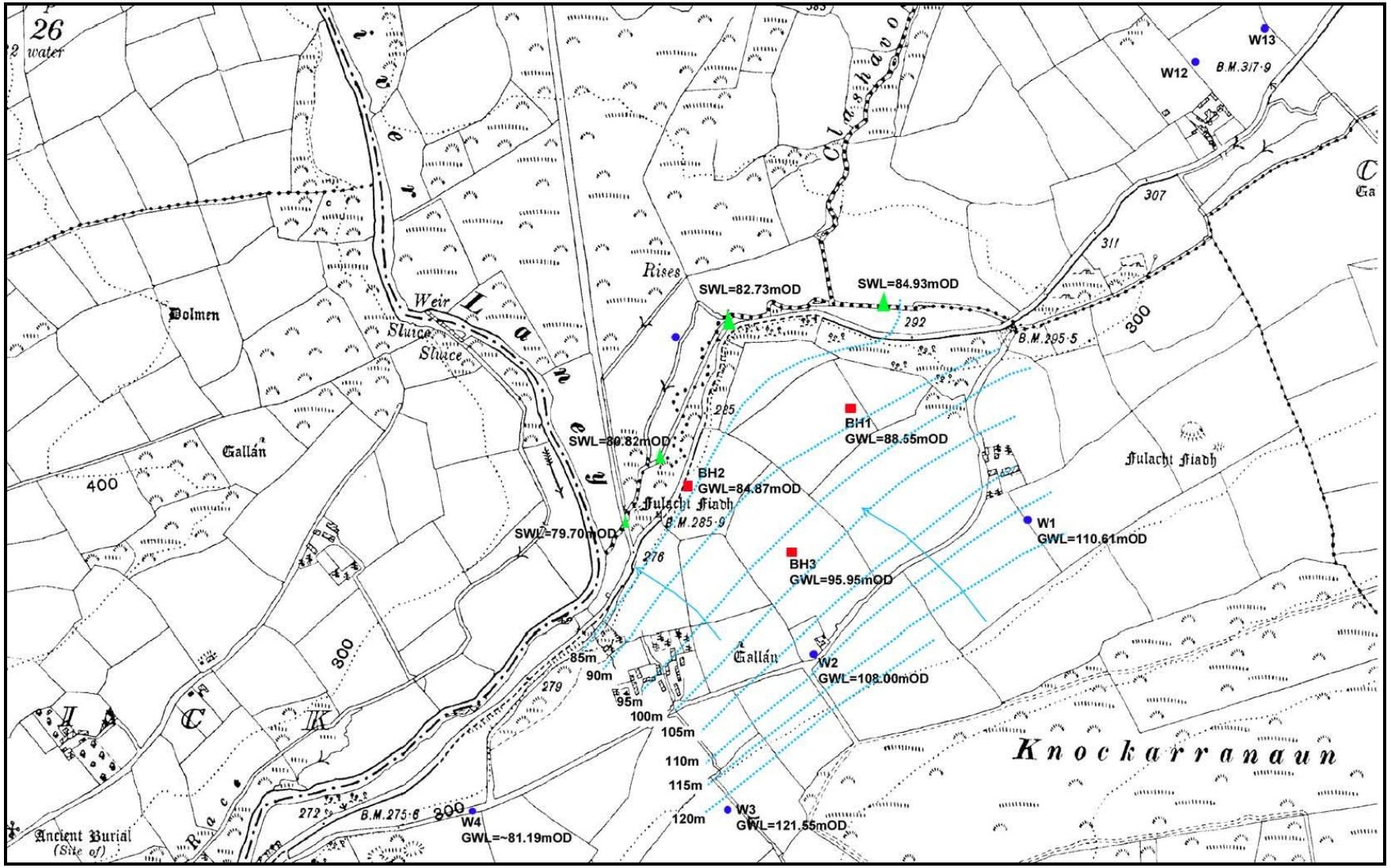

Figure 8-5: Groundwater Flow Map

9. ARCHITECTURAL, ARCHAELOGICAL & CULTURAL HERITAGE

9.1 Introduction

This Environmental Impact Assessment Report (EIAR) prepared on behalf of KGEC has been undertaken to assess the significant effects, if any, on the archaeology, cultural heritage and architecture which can reasonably be expected to occur because of the proposal to extract sand and gravel on land in the townland of Ummera, County Cork. A wide variety of paper, cartographic, photographic and archival sources was consulted. All the lands of the application area were visually inspected.

An impact assessment and mitigation strategy has been prepared. The assessment has been undertaken to assess the significant effects, if any, on the archaeology, cultural heritage and architecture which can reasonably be expected to occur because of the proposal to carry out extraction in the application area, while a mitigation strategy has been designed to remedy any significant adverse effects on cultural heritage.

The assessment was prepared by Dr. Charles Mount who has more than twenty-five years of cultural heritage assessment experience. He holds B.A., M.A. and Ph.D. degrees in archaeology as well as a professional diploma in EIA and SEA Management and is a member of the Institute of Archaeologists of Ireland.

9.2 Methodology

This study which complies with the requirements of Directive EIA 2014/52/EU is an assessment of the known or potential cultural heritage resource within a specified area and includes the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. It consists of a collation of existing written and graphic information in order to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, archaeological and structural resource using an appropriate methodology (EPA 2002 and 2003).

The study involved detailed investigation of the cultural heritage including the archaeological, architectural and historical background of the proposed development site and the surrounding area up to 1km from the development. The study area is indicated on Figure 9-1. This area was examined using information from the:

- Record of Monuments and Places (RMP) of County Cork.
- The Sites and Monuments Record.
- The Cork County Development Plan 2014-20 including the Record of Protected Structures.
- The National Inventory of Architectural Heritage.
- Aerial photographs.
- Excavation reports.
- Cartographic.
- Documentary sources.

A field assessment was carried out on 10 October 2019 to identify and assess any known archaeological sites and structures and previously unrecorded features, possible finds and structures within the application area.

9.3 Existing Environment

9.3.1 The Landscape

The application area is situated in mid County Cork, c.2.5km northeast of the town of Macroom and c.1.7km northeast of the R618 road. It is situated on coarse loamy drift with siliceous stones that overlays compact drift with siliceous stones.

9.3.2 Archaeological and Historical Development of the Study Area

The following is a brief summary of the archaeological and historical development of the study area and the main types of sites and monuments that are known from the surrounding landscape. The information is drawn from the assessment. It is intended to indicate the types of sites and monuments known to be present in the study area as well as the pattern of landholding and to place this material in its cultural heritage context. The application area is situated in the townland Ummera, the parish of Aghinagh and the barony of Muskerry East. Note the spellings of place names varied throughout history, the historical spellings are used here.

Prehistoric Period
Prehistoric activity in the study area is indicated by a range of monument types. There is a wedge tomb in Bealick townland (RMP CO071-020----) dating from the Chalcolithic. There is also an Early Bronze Age burial cist in Bealick townland (RMP CO071-018002-) that contained cremated remains accompanied by an encrusted urn and a vase food vessel (O'Kelly 1944, Ó Ríordáin and Waddell 1993, 94). Fulacht fia, prehistoric mounds of heated stone, are known from Curraghanearla (RMP CO071-031----), Shankill (RMP CO071-026----) and Ummera (RMP CO071-059001- and CO071-059002-) townlands. There are also several standing stones known from the study area in Bealick (RMP CO071-019 ----), Coolkisha (CO071-028----), Curraghanearla (RMP CO071-030----) and Ummera townlands (RMP CO071-057----).

Early Medieval Period
The study area is situated in the barony of East Muskerry. The barony of East Muskerry was known in the early Medieval period as the cantred of Múscraige Mittíne after the sept who controlled it. The cantred was ruled by the Uí Bercháin and Uí Blaithmeic septs and the Ua Donducáin and Ua Flainn Kings (MacCotter 2008, 157-8). Settlement in the Early Medieval period is indicated by the presence of enclosed farmsteads known as ringforts. There is a ringfort known in the study area in Ummera townland (RMP CO071-059001-). Two souterrains, underground chambers, that are contemporary to ringforts probably indicated the existence of another ringfort in Ummera townland (RMP CO071-056001- and CO071-056002-). The holy well (RMP CO071-009----) and ritual bullaun stone (RMP CO071-010----) in Kill townland may indicate a medieval ecclesiastical site in the vicinity.

The Later Medieval Period
Following the submission of Dermot MacCarthy King of Desmond to King Henry II in 1171 and the occupation of the city of Cork, Robert fitz Stephen and Milo de Cogan used the city as a base to occupy the Kingdom of Desmond. After they defeated Dermot MacCarthy, he granted them 7 cantreds of Desmond. In 1207 Richard de Cogan (son of Milo de Cogan's brother, Richard) was granted Múscraighe Mittaine by King John, which embraced the present baronies of East and West Muskerry and Barrett's.

The process of Norman infeudation is normally associated with the construction of timber castles, known as Motte and Baileys. However, there are no Motte castles known from the study area. In Ireland the manor houses of local lords were sometimes enclosed by rectangular moats and are referred to as moated sites. They are a useful indicator of Anglo-Norman settlement. However, there are no moated sites in the study area and the closest example is in Knockaneamealguylla townland (RMP CO084-031----) to the south-west of the study area. Anglo-Norman influence in the study area was short-lived. In 1353 Cormac McCarthy, King of Desmond, was granted lands around Macroom and his son Diarmaid became lord of Muskerry (Ó Murchada 1993, 216).

The Post-Medieval Period
The McSweeneys were granted Mashanaglashy, which included Ummera, by the McCarthy Lord of Muskerry in 1584 and appear to have built the tower house in the southern part of the townland (RMP CO071-096002). The Down Survey records that in 1641 Ummera townland was part of Mashanaglashy which was held by Owen McSweeney from the Earl of Clancarty, Donough MacCarthy (http://downsurvey.tcd.ie) and he is recorded as holding it in the Civil Survey of 1654-6 (Simington 1942). The Fifteenth Annual Report from the Commissioners of Public Records of Ireland (1825, 356) records that in 1703 Richard Gumbleton of Lismore held Ummerie, formerly part of the estate of Donogh late Earl of Clancarty. The lands passed to H.A. Bushe and then to the architect Sir Thomas Deane of Dundanion Castle, Cork (http://landedestates.nuigalway.ie). Lewis' Topographical Dictionary (Ahinagh, or Aghinagh, a parish) records that c.1837 Ummera was still held by Thomas Deane.

9.3.3 Buildings

Designated structures
The Cork County Development Plan 2014-20 was examined as part of the baseline study for this section of the EIAR. The review established that there are no structures listed in the Co. Cork Record of Protected Structures situated within the application area or the study area.

Non-designated structures
The National Inventory of Architectural Heritage (NIAH) which is maintained by the Dept of Culture, Heritage and the Gaeltacht was examined as part of the baseline study for this section of the EIAR on 25 September 2019. The review established that there are no structures listed in the NIAH situated within the application area or the study area.

9.3.4 Field Inspection

On 10 October 2019 fieldwork was carried out to identify any additional non-designated structures of heritage interest in the vicinity of the application area. This involved assessing all upstanding structures that are marked on the 1938 edition of the six-inch Ordnance Survey mapping within 100m of the application area (see Figure 9-1). There are three upstanding houses with associated outbuildings situated within this area that are not of heritage interest (see below).

1. Ummera - Three-bay, two-storey house with hipped slate roof and two chimneys and rendered walls. New porch and windows and extension to the rear. Part of a farmyard consisting of outbuildings of random rubble construction, some with corrugated roofs (see Plate 9-1).
   No heritage interest.

2. Ummera - Two-bay one-storey cottage with slate roof and single chimney (see Plate 9-2).
   No heritage interest.

3. Ummera - This is a group of farmyard structures consisting of a farmhouse and 10 other structures, which are outside the further development area. The house and outbuildings were assessed and conserved by record in February 2006 by Margaret Shine for the quarry registration and then assessed by the Cork County Heritage Officer (QR01, see Figure 9-2). Building 1 is a two-bay, two-storey gable-ended out-building with random rubble construction and slate roof. Building 2 is a three-bay, two-storey gable-ended house of random rubble construction. The house has a chimney at each gable but is missing its roof (Plate 9-3). Building 3 is a range of three single-storey outhouses of random rubble construction now partly roofed. Building 4 is a range of three single-storey outhouses of random rubble construction now partly corrugated roofed. There is also a barn and shed.

On 28 June 2006 Louise Harrington, The Cork County Heritage Officer wrote to the Planning Department Cork County Council and stated:

'*I visited this site on the 26th June 2006. I note the archaeological record of the existing disused farmhouses. This will suffice as conservation by recording. The buildings are not protected structures nor would they be worthy of designation. There are no other architectural heritage issues on this site'*.

9.3.5 Archaeological Assessment

Recorded Monuments
There is one Recorded Monument situated within the applicant's landholding (see Appendix 9-1). There is the site of a Fulacht fia described in the RMP as:

CO071-058---- UMMERA Fulacht fia
On E side of stream, in sand and gravel works. Shown on 1938 OS 6-inch map as circular mound. No visible surface trace.

The monument is in an area that was granted planning permission by Cork County Council for settlement ponds in 1978 (Planning reg. No. PL1365/78). The site of the monument was visited on 10 October 2019 as part of this assessment. There is no visible indication of the monument in the location indicated in the Record of Monuments (Plate 9-4). This planning proposal does not include any works in the area of the site of the monument.

The closest Recorded Monument externally to the application area is a Standing Stone RMP CO071-057----. This is described in the RMP as:

CO071-057---- UMMERA Standing stone
In pasture, on S-facing slope [sic]. Stone (H 1.25m; 0.89m x 0.2m) is subrectangular in plan, long axis WNW-ESE (see Plate 9-5).

An Bord Pleanála decision relating to the registration of the gravel pit in accordance with Section 261 of the Planning & Development Act 2000 (QR01) contained condition 61 that stated the following:

61. No works shall take place within a 20 metre radius of the external perimeter of monument number CO071:057, a standing stone. The area shall be appropriately protected.
Reason: To ensure the continued preservation of this object of archaeological interest.

An Bord Pleanála condition will be respected in regard to the proposed development and a 20m fenced buffer zone will be maintained around the monument.

The next closest Recorded Monument externally to the applicant's landholding is a Ringfort CO071-059001-. This is described in the RMP as:

CO071-059001- UMMERA Ringfort – rath
In pasture. Arc of hachures SE->SW depict bank on 1938 OS 6-inch map, broken line SW->SE completes circle enclosing oval area. Circular, slightly raised area (diam. 23m) enclosed by low earthen bank in parts (int. H 0.3m; ext. H 0.4m). According to local information, known as the fort field. Fulacht fiadh (CO071-059002-) c. 20m to SE of enclosure.

This monument is situated c.270m east of the applicant's landholding and is considered too far distant to be directly or indirectly impacted. The remaining Recorded Monuments in the study area are considered too far distant to have be impacted by the proposal.

Sites and Monuments Record
A review of the Sites and Monuments Record which is maintained by the Dept. of Culture, Heritage and the Gaeltacht at http://webgis.archaeology.ie/historicenvironment/ on 24 September 2019 indicated that there are no additional sites listed in the application area or the study area.

Cartographic Sources
The Ordnance Survey 1st and 3rd edition six-inch maps of the area were examined. This analysis did not indicate any previously unrecorded archaeological sites or monuments.

Place Name Evidence
The place names were extracted from the cartography in order to facilitate the search for structures and monuments and small finds, to help identify any unrecorded monuments or structures, to search for any published papers and documents related to the study area and to assist in the study of the historical development of the area. The English translations of the townland names of the study presented below are based on the Placenames Database of Ireland. The placenames analysis did not indicate any additional cultural heritage material in the application area.

Table 9-1: English Translations of Townland Names

Townland Name	English Meaning
Bealick	ford of the flagstone
Coolkisha	corner of the hurdle
Curraghanearla	the earl's moor
Kill	church
Knockeenacuttin	hillock of commonage
Lackavunaknick	flagstones at the foot of the hill
Shanakill	old church
Ummera	a ridge

Aerial Photographs
Examination of the Ordnance Survey 1995, 2000 and 2005 imagery as well as Google Earth imagery from 2009, 2013 and 2018 and Bing maps imagery from 2011 did not indicate any additional cultural heritage or archaeological sites.

Other sources
Examination of archaeological corpus works on prehistoric artefacts (Harbison 1969, Eogan 1965, 1983, 2000) and pottery (O' Ríordáin and Waddell 1993) and Iron Age material (Raftery 1984) did not reveal any additional material.

9.3.6 Previous Assessments

Examinations of the Excavations Bulletin www.excavations.ie indicated that there have been no licensed archaeological excavations carried out in the study area.

The existing gravel pit was the subject of an archaeological impact assessment carried out as part of quarry registration in accordance with Section 261 of the Planning & Development Act 2000 (QR01) in February 2006 by Margaret Shine for Sheila Lane & Associates. The assessment noted that the site of the Fulacht fia (RMP CO071-158) was inaccessible due to dense undergrowth. The assessment recommended that the standing stone (RMP CO071-158) should be preserved *in situ* within a 20m buffer zone.

On 12 June 2006 Catryn Power, the Cork County Archaeologist, wrote to the Planning Department Cork County Council and stated:

'*MS14*
Buffer Zone Condition
The development should be located no closer than 20m to the nearby archaeological monument (s). This buffer zone should be established by a suitably qualified archaeologist.

No construction works, stockpiling of topsoil etc, or any development, or landscaping and/or planting should take place within the 20m buffer zone. No trees, plants etc should be removed from the buffer zone.'

On 29 May 2006 Finola McDonald of the Development Applications Unit, Department of the Environment, Heritage and Local Government wrote to the County Secretary, Cork County Council and stated:

> '*It is noted that the proposed development is within the zone of archaeological potential established around the Recorded Monument CO071:057, a standing stone, which is subject to statutory protection in the Record of Monuments and Places established under section 12 of the National Monuments (Amendment) Act 1994.*
>
> *We will have no objection from the archaeological perspective to this development proceeding, provided that the following is included as a condition in any grant of planning permission that may issue*;
>
> "*No groundworks for construction or landscaping shall take place within 30 metres of the external perimeter of monument number CO071:157, a standing stone.*
>
> *Should planting take place within this buffer zone only plants with shallow root systems should be chose*"
>
> ***Reason:*** *To ensure the continued preservation (either in situ or by record) of places, caves, sites, features or other objects of archaeological interest*'.

The farm structures at the southwest of the applicant's landholding were also photographed and conserved by record as part of the archaeological assessment. On 28 June 2006 Louise Harrington, The Cork County Heritage Officer wrote to the Planning Department Cork County Council and stated:

> '*I visited this site on the 26th June 2006. I note the archaeological record of the existing disused farmhouses. This will suffice as conservation by recording. The buildings are not protected structures nor would they be worthy of designation. There are no other architectural heritage issues on this site*.'

9.3.7 Planning History

The existing gravel pit commenced as a pre-1964 development. It was granted planning permission by Cork County Council in 1976 (PL 76/375 – the Lordan permission) and 1978 (PL1365/78 – the M&OS washing plant permission). The gravel pit was registered in accordance with Section 261 of the Planning & Development Act 2000 (QR01) in September 2004. Cork County Council modified and added to the conditions imposed under 76/375 in September 2006. Condition 61 stated that:

> '*No groundworks, development/construction works, stockpiling of topsoil/spoil or landscaping shall take place within 30m metres radius of the external perimeter of monument CO071:057, a standing stone. This buffer zone of 30m radius shall be established by a suitably qualified archaeologist and no trees plants, etc. shall be removed from within this buffer zone*.'

A number of the conditions, including No. 61, were appealed to An Bord Pleanála in October 2006 (04.QC2002). In June 2007, An Bord Pleanála issued its decision, in relation to condition 61 the Inspector's report stated:

'Condition 61 - No works (whatsoever) to take place within 30m of Standing Stone
A 20m buffer was requested by the Heritage unit of the Authority and the company consider that sufficient. This requirement was in line with the recommendation of the company's own archaeologist.

Inspector's Recommendation
The condition, as drafted, would not appear to have had a specific site in mind. This standing stone is in the middle of an open pasture field with no trees or plants other than grass in the vicinity. I consider that fencing off appropriately an area of 20m radius will protect the standing stone.'

In its decision, An Bord Pleanála modified condition 61 to the following:

'61. No works shall take place within a 20 metre radius of the external perimeter of monument number CO071:057, a standing stone. The area shall be appropriately protected.
Reason: To ensure the continued preservation of this object of archaeological interest.'

9.3.8 Field Inspection

A field inspection was carried out on 10 October 2019. This involved an inspection of all the lands of the application area (see Plate 9-6).

Area 1 is the existing area of extraction and processing (Plate 9-7). There is no visible indication of any cultural heritage material.

Area 2 is a long and narrow area enclose by banks situated to the west of Area 1 on the west side of local road L-3423. Cork County Council granted permission for settlement ponds in this area in 1978 (Planning reg. No. PL1365/78). The area is now overgrown with woodland (Plate 9-8). Examination of the marked site of RMP CO071-058---- Fulacht fia indicated that there was no visible indication of the monument at ground level (Plate 9-4). There is no visible indication of any cultural heritage material.

Area 3 is a roughly triangular-shaped field of north-west sloping pasture enclosed by low drystone walls. The northern part of the field has been extracted and most of the field is overgrown with ferns and brambles (Plate 9-9). There is no visible indication of any cultural heritage material.

Area 4 is a six-sided field of northwest sloping pasture enclosed by low drystone walls and mature trees with the existing gravel pit at north (Plate 9-10). The Recorded Monument CO071-057---- Standing stone is situated roughly in the centre of the southern part of the field externally to the further development area (Plate 9-5). There is no other visible indication of any cultural heritage material.

9.4 Impact of the Development

There is one Recorded Monument situated within the application area, the site of a Fulacht fia RMP CO071-058---- and is in an area granted planning permission for settlement ponds in 1978 and is not visible at ground level. This planning proposal does not include any works in the area of the site of the monument and there will be no impact related to this proposal.

A Standing stone RMP CO071-057---- will be preserved *in situ* within a 20m fenced buffer zone in accordance with the 2007 decision of An Bord Pleanála (04.QC2002)), and will not be impacted by the proposal.

There are no other direct or indirect impacts on any other known items of archaeology, cultural heritage or buildings of heritage interest in the application area or the vicinity.

9.5 Worst case scenario

In the worst-case scenario soil-stripping of the unstripped lands within the application area, in areas 3 and 4 may impact previously unknown archaeological deposits or artefacts without preservation by record taking place.

9.6 Mitigation Measures

Due to the possibility of the survival of previously unknown sub-surface archaeological deposits or finds within the unextracted part of the application area, in areas 3 and 4 all topsoil-stripping in those areas should be monitored by a qualified archaeologist.

9.7 Conclusions and Recommendations

There is one Recorded Monument situated in the application area, the site of a Fulacht fia RMP CO071-058----, which is not visible at ground level, and is not impacted by the proposal. A standing stone RMP CO071-057---- is situated outside the application area, it will be preserved *in situ* within a 20m fenced buffer zone in accordance with the 2007 decision of An Bord Pleanála (04.QC2002), and will not be impacted by the proposal. There are no other known sites of heritage interest known from the application area. Due to the possibility of the survival of previously unknown sub-surface archaeological deposits or finds within the unextracted part of the application area, in areas 3 and 4, all topsoil-stripping in those areas should be monitored by a qualified archaeologist.

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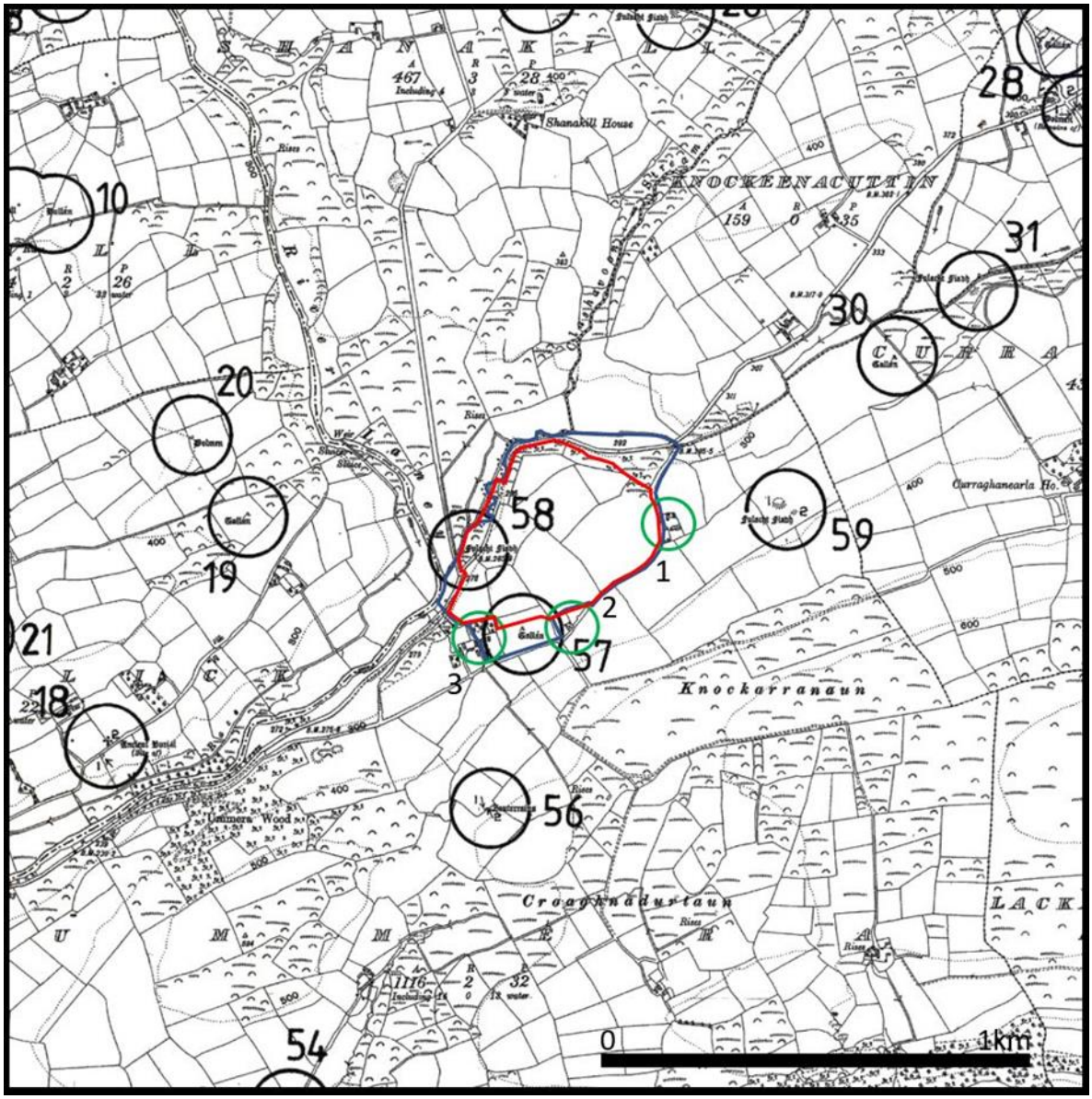

Figure 9-1: Record of Monuments for County Cork

Notes:

The assessment study area superimposed on the Record of Monuments for Co. Cork. The land under the control of the applicant is indicated with the blue line. The substitute consent area is outlined in red. Recorded monuments are indicated with black circles. The upstanding structures situated within 100m are indicated with green circles.

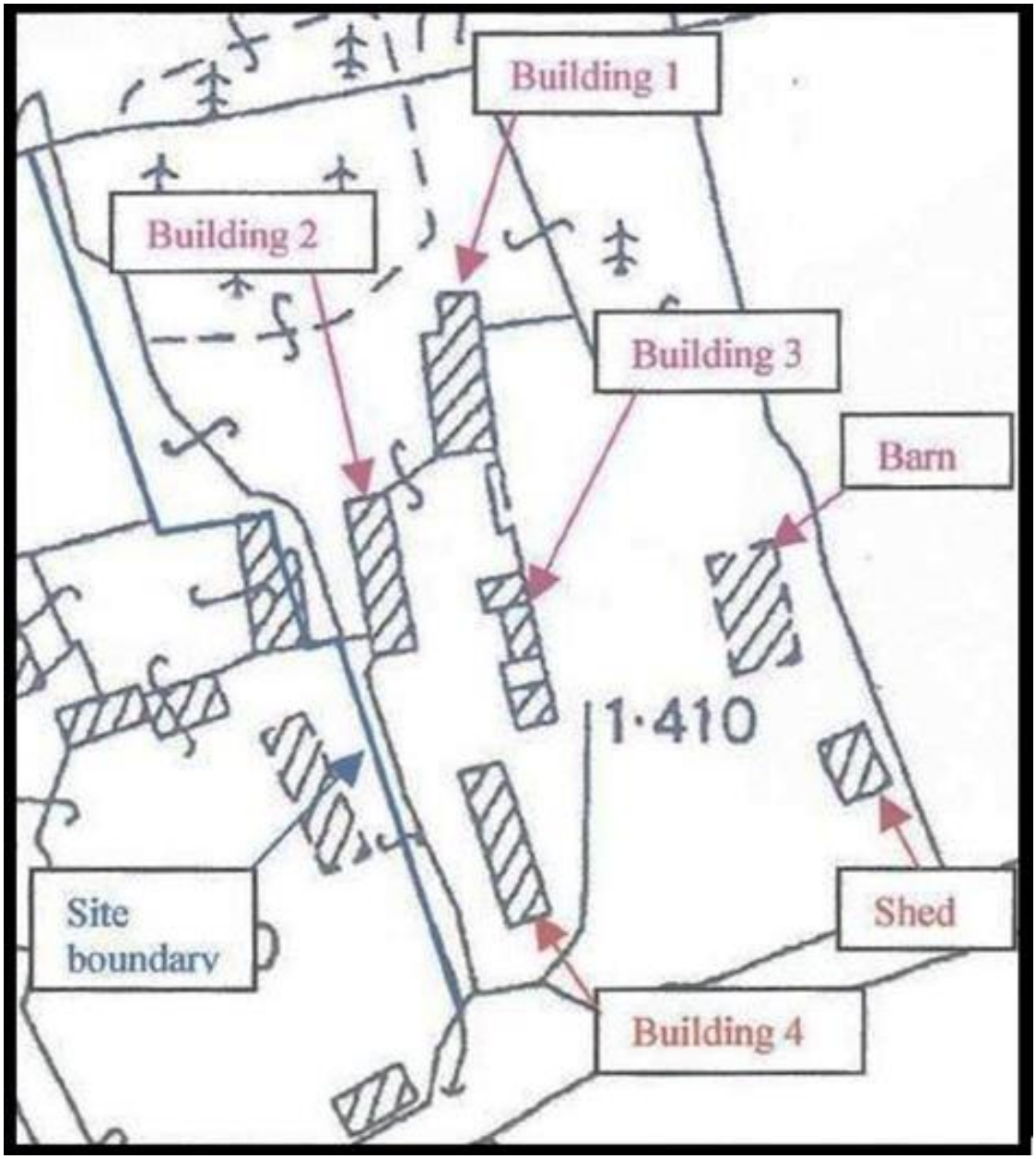

Figure 9-2: Plan of Structure No. 3 (Building 2) and Associated Outbuildings

Plate 9-1: View of Structure 1 Looking Northeast

Plate 9-2: View of Structure 2 Looking Northwest

Plate 9-3: View of Ruined House Structure 3 Looking Southwest

Plate 9-4: View of CO071-058----Location: Fulacht fia Looking Southwest

Plate 9-5: View of CO071-057----Location: Standing Stone Looking West

Plate 9-6: Aerial View of Application Area
Source - 2018 Google earth image

Plate 9-7: Panoramic View of Existing Gravel Pit Looking West

Plate 9-8: View of Area 2 Looking Northeast

Plate 9-9: Panoramic View of Area 3 Looking West

Plate 9-10: Panoramic View of Area 4 Looking North

Note - RMP CO071-057---- visible in the centre

10. BIODIVERSITY

10.1 Introduction

This chapter identifies, quantifies and evaluates the effects of future extraction activities and potential effects of a continuation of these activities on habitats species and ecosystems in the surrounding environment. It considers impacts to ecological receptors with mitigation measures used to offset or reduce the identified potential impacts.

The development is the Ummera gravel pit where extraction of sand & gravel has taken place since the 1940's. Ummera gravel pit is located within predominantly agricultural lands in the townland of Ummera; 2.5km northeast of Macroom town (see Site Location Figure 1-1). The existing gravel pit is bound by the Clashavoon Stream and its associated woodland to the north and west.

The sand & gravel is won by excavator and front-end loader and is processed on site using a washing / screening plant. A full description of the site activities is provided in Chapter 2.

10.1.1 Description of the Existing Quarry

See Chapter 2 for full description of historical and the ongoing activities at the Ummera gravel pit.

10.2 Methodology

The methodology used to carry out the survey of the Site, to evaluate the ecological value and to prepare the biodiversity chapter is outlined in this section.

10.2.1 Desk Study

A desk study was carried out to collate the available existing ecological information on the gravel pit. Available literature on the Site (the landholding) was reviewed to inform the field work and impact assessment. A review of available mapping and aerial photography was undertaken using Bing maps.

The Environmental Protection Agency (EPA) Envision mapping[1] system was used to identify any hydrological connection between the proposed project and Natura 2000 sites.

The National Biodiversity Data Centre (NBDC) was accessed for information on protected habitats and species known from the 2km grid squares W37R and W37S within which the site is located (last accessed 29th June 2020). Only records for the past 10 years are included within this report as older records are unlikely to still be relevant given their age and the changes in land management that has occurred in the intervening period. Bat records within 2km of the survey area were also reviewed using the NBDC website.

Birds of Conservation Concern in Ireland (BoCCI), published by Bird Watch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the island of Ireland. (Colhoun and Cummins, 2013). The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists (Red, Amber and Green) based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, those on the Amber List are of medium conservation concern and those on the Green List are not considered threatened.

[1] http://gis.epa.ie/Envision

The conservation status of mammals within Ireland and Europe is evaluated using one or more of the following documents; Wildlife Acts (1976 - 2012), the Red List of Terrestrial Mammals (Marnell *et al*., 2009) and the EU Habitats Directive 92/43/EEC.

10.2.2 Consultation

Keohane Geological & Environmental Consultancy on behalf of DCWL engaged in consultation with Inland Fisheries Ireland (IFI) and National Parks and Wildlife Service (via the Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht) on the proposed Section 37L (S37L) application for Ummera Gravel Pit including future development at the site. The following is a summary of all correspondence provided to Atkins Ecology:

Development Applications Unit (NPWS)

13th February 2020
Keohane Geological & Environmental Consultancy wrote to the DAU informing the DAU/NPWS of their intention to prepare a remedial Environment Impact Assessment Report (rEIAR) for the Ummera Gravel Pit near Macroom County Cork, as well as the EIAR for the continuation and extension of gravel extraction at the site.

17th February 2020
NPWS acknowledged receipt of consultation.

Inland Fisheries Ireland

16th March 2020
Keohane Geological & Environmental Consultancy write to the IFI. KGEC informed the IFI of their intention to prepare a remedial Environment Impact Assessment Report (rEIAR) for the Ummera Gravel Pit near Macroom County Cork, as well as the EIAR for the continuation and extension of gravel extraction at the site.

3rd April 2020
IFI acknowledge receipt of consultation and informed KGEC the application should consider; *detail and analyse the mechanisms for and impacts of all discharges and abstractions associated with the proposed developments.*

10.2.3 Zone of Influence

The '*zone of influence*' for a project is the area over which ecological features may be subject to significant effects because of the project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).

It follows that given the nature of the development at Ummera, the zone of influence will be limited to the development site and immediate environs as well as areas connected via hydrological pathways (ground or surface water) and landscape features such as hedgerows and treelines.

Determining the potential for impacts and the zone of influence is based on the source-pathway-receptor chain principle and involves assessing likely significant effects on ecological receptors within the zone of influence in relation to three pathways: -

- Surface water
- Groundwater
- Land & Air

10.2.4 Ecological Field Surveys

A summer and winter site visit were carried out on 19 July 2019 and 05 December 2019. A phase 1 habitat survey of the active gravel pit void, as well as surrounding lands within DCWL ownership were surveyed. The findings of this survey work are presented in Section 10.4. This describes habitats and species which are present on or adjoining the gravel pit. Section 10.5 then considers the potential for ecological impacts.

Any fauna, (i.e. terrestrial mammals, birds and invertebrates), noted during this survey were also recorded. During the site walkover in July and December 2019, the site was assessed in particular for the presence and signs of badger (*Meles meles*) activity. While the July site walkover was carried out outside of the more optimal survey period for badger all field boundaries were accessible and clearly visible during the walkover; these were checked again in December 2019 for the presence of badger.

Bats
A specialist bat activity survey was carried out by Caroline Shiel B.Sc., Ph.D at Ummera gravel pit on 27 July 2019. One surveyor conducted an emergence watch at the site office. The second surveyor conducted an emergence survey of the farm buildings at the southern edge of the landownership. The locations of the dawn survey were decided following a walked-transect survey with hand-held bat detectors. Based on bat activity at the site, the dawn surveys took place within the vicinity of the settlement ponds, within the grass field to the south of the extraction area and along a mature treeline on the south-western landownership boundary near the old farm buildings.

Additionally, two no. Songmeter and four no. bat detectors were set up on site to remotely monitor bat activity at two locations overnight. These units were programmed to run from 20 minutes before sunset to 20 minutes after sunset. The first Songmeter was placed on an earthen bank at the settlement pond at the northern end of the site. The second location selected was on a track in the centre of the site. This track was lined with immature scrub willow.

On the night of 27 June 2019, two surveyors conducted emergence surveys at dusk, followed by walked transects of the site. Dawn surveys were conducted on the morning of 28 June 2019 to record any bats returning to roosts prior to sunrise. Equipment used included a Pettersson D240X time expansion bat detector, a Pettersson D200 heterodyne detector and an Echometer Touch Pro detector plugged into an ipad.

One surveyor conducted an emergence watch at the site office. The second surveyor conducted an emergence survey at the southern edge of the extraction area to investigate if bats were commuting from the farm buildings in the southwestern corner of the DWCL land holding. The dusk surveys commenced 20 minutes before sunset and lasted 1.5 hours. Result of the bat surveys carried out at Ummera are summarised in Section 10.4 (see Appendix 10-1 for full report).

10.2.5 Aquatic Ecology

Fieldwork was carried out on 05 November 2019. No heavy rainfall had occurred for approximately 4 days prior to sampling. Macroinvertebrate samples were taken at two sites; downstream and upstream of the surface water abstraction point. The two sampling sites are located on the Clashavoon Stream (EPA Name: Bealick) and the grid references for the sampling sites are given below. The riverbank between the two sampling sites was walked and any notable observations were recorded.

Samples were taken using a standard hand-held net (250mm width, mesh size 1mm) and comprised a 2-minute ‘kick’ sample with 1-minute ‘stone wash’. The samples were live sorted for a minimum of 20 minutes and identified on the bankside. Macroinvertebrates were identified and abundances recorded to the level required for the Small Stream Risk Score (SSRS) method (Ryan *et al*., 2015). Taxa that are excluded from the SSRS were also identified and recorded.

The abundance classes set out in the SSRS methodology are as follows:

- 1 - 5 individuals = 1
- 6 - 20 individuals = 2
- 21 - 50 individuals = 3
- 51 – 100 individuals = 4
- 101^{+} individuals = 5

Table 10-1: Location of Macroinvertebrate Sampling Sites

Site No.	Location description	Grid reference (ITM)
Site 1	Downstream of abstraction point.	536783 / 573857
SW abstraction point	Pump house and outfall on left riverbank upstream of man-made weir.	536873 / 574029
Site 2	Upstream of abstraction point.	536969 / 574115

Freshwater Pearl Mussel (*Margaritifera margaritifera*)
At sites 1 to 3, the stream was assessed for the presence of Freshwater pearl mussel (FWPM) potential habitat and potential for host fish to occur in the stream. Ecological pressures such as hydrological regime modification, land use and pollution sources were also noted within the catchment. The potential of FWMP to occur within this habitat is discussed in Section 10.4.

10.2.6 Evaluation Ecological Receptors

The evaluation and impact assessment within this report has been undertaken with reference to relevant parts of the 2018 *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine* - developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) as well as *Guidance on Ecological Survey and Assessment in the Republic of Ireland and Northern Ireland During the Covid-19 Outbreak* published by CIEEM in May 2020.

The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known / published accounts of distribution and rarity where available, and professional experience:

- International (European).
- National (Ireland).
- Regional (Munster).
- County (Cork)
- Townland (Ummera).
- Local (intermediate between the Site and Townland).

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate to, for example, the quality or extent of the site or habitats therein; habitat and / or species rarity; the extent to which such habitats and / or species are threatened throughout their range, or to their rate of decline.

10.2.7 Determining Ecologically Significant Effects

The Guidelines (CIEEM, 2018) define an ecologically significant impact as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area.

The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified (CIEEM, 2018). Best scientific professional judgement has been used in some cases, to assess the significance of predicted effects in line with National Roads Authority Guidelines (NRA, 2009).

10.2.8 Precautionary Principle

The evaluation of significant effects should always be based on the best available scientific evidence. If sufficient information is not available, further survey or additional research may be required. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect should be assumed. Where uncertainty exists, it must be acknowledged.

10.2.9 Mitigation

Where significant impacts have been identified, the mitigation hierarchy has been considered, as suggested in the 2018 EcIA Guidelines (CIEEM, 2018) which sets out a sequential approach of avoidance of impacts where possible, application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, along with any necessary compensation measures, and opportunities for enhancement incorporated, residual impacts have then been identified.

10.3 Existing Environment

10.3.1 Protected Sites

European Designated Sites
European designated sites comprise of Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). This network of European designated sites is referred to as the Natura 2000 network. SACs are designated for their biodiversity value based on the presence of Annex I habitats and Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC).

The Ummera gravel pit is not located within, or directly adjacent to any designated nature conservation areas.

There are 3 no. Natura 2000 sites within 15km of the study site; The Gearagh SAC (000108) (c. 3.5km southeast), The Gearagh SPA (004019) (4.6km southwest) and Mullaghanish to Musheramore Mountains SPA (004162) (c. 6.9km northwest) (Figure 10-1 & 10-2).

The Curraghanearla Stream flows in a general southwestern direction along the northern-western boundary of the site before meeting the Clashavoon Stream and discharging to the Laney River, southwest of the site (the catchment of the Laney is shown in Figure 7-1). The Laney River enters the River Sullane south of Macroom and out into the Sullane Delta where it is joined by waters flowing from the Gearagh (River Lee) – before entering the River Lee / Carrigadrohid reservoir. From here the River Lee flows towards Cork Harbour where it enters Great Island Channel SAC and the Cork Harbour SPA; 60.6km and 50.75km east of the Ummera gravel pit, respectively. Therefore, the site shares a remote hydrological connection with Great Island Channel SAC and the Cork Harbour SPA.

There is no direct hydrological link to the Gearagh SAC and the Gearagh SPA as these are upstream of the confluence of the Lee and Sullane rivers.

The groundwater flow beneath the gravel pit is not directly connected to the Gearagh SAC / SPA, nor any of the other Natura 2000 Sites within 15km. However, the groundwater likely provides baseflow to the Clashavoon Stream and Laney River, therefore a very remote hydrogeological connection exists with the site and Great Island Channel SAC and Cork Harbour SPA.

The Mullaghanish to Musheramore Mountains SPA is located to the northwest of Ummera. Watercourses draining off the SPA join the Lee west of Macroom and the River Laney upstream of the gravel pit. Groundwater flow is anticipated to follow a similar pattern; no impacts to Mullaghanish to Musheramore Mountains SPA are expected.

Natural Heritage Areas
Natural Heritage Areas (NHAs) are nationally designated sites, which are considered important for the habitat, species or geological heritage. NHAs are legally protected under the Wildlife Amendment Act 2000. Proposed Natural Heritage Areas (pNHAs) are sites that are of significance for wildlife and habitats, but which have not, as yet, been statutorily designated; however, their ecological value is recognised by Planning and Licencing Authorities.

There are no NHAs within 15km of Ummera gravel pit, however 5 no. pNHAs are located within 15km (Figure 10-3). The closest pNHA (Lough Gal pNHA) is located ca. 2.3km northeast of the Site. None of the pNHA sites within 15km share connectivity with the gravel pit.

All other sites designated for nature conservation are considered to be outside the potential zone of influence of the gravel pit given the separating distance (see Table 10-2); the absence of surface water pathways linking them; the absence of landscape connectivity; the localised nature of the development and / or its specific characteristics.

Nature Reserves
The Gearagh Nature Reserve is the only Nature Reserve located within 15km of the Site. This site is the largest area of alluvial woodland in Ireland; 300 ha. This site is not within the zone of influence of the project and is not considered further.

Other Non-statutory Designated Sites of Ecological Value
There are no other non-statutory designated sites of ecological value, such as, Wildlife Sanctuary, located within 15km of the gravel pit.
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Table 10-2: European Sites within 15km of Ummera

Site	Site no.	Distance	Qualifying Interests	Connectivity
The Gearagh SAC	000108	3.5km southwest	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] *Lutra lutra* (Otter) [1355]	**No** There is no spatial overlap and no hydrological link between the gravel pit and the Gearagh SAC. This site is screened out and not considered further.
The Gearagh SPA	004019	4.6km southwest	Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Coot (*Fulica atra*) [A125] Wetland and Waterbirds [A999]	**No** There is no spatial overlap and no hydrological link between the gravel pit and the Gearagh SPA. Furthermore, the SPA is too remote from the quarry operation at Ummera for there to be negative impacts to birds using the SPA. This site is screened out and not considered further.
Mullaghanish to Musheramore Mountains SPA	004162	6.9km northwest	Hen Harrier (*Circus cyaneus*) [A082]	**No** There is no hydrological link between the gravel pit and Mullaghanish to Musheramore Mountains SPA. Furthermore, the SPA is too remote from the quarry operation at Ummera for there to be negative impacts to Hen Harrier in the SPA. This site is screened out and not considered further.

Table 10-3: NHA and pNHAs within 5km of Ummera

Site	Site Code	Approximate distance	Features of Interest	Connectivity
Lough Gal pNHA	001067	2.3km	The present Natural Heritage Area includes an extensive area of freshwater marsh with abundant willow (*Salix* spp.) scrub invasion. Lesser Marshwort (*Apium inundatum*) and several pondweeds (*Potamogeton* spp.) occur on the lake. Reported a good site for wildfowl, ducks, geese and swans.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
The Gearagh pNHA	000108	3.5km	Encompassed within The Gearagh SAC and SPA (see Table 10-2).	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Lough Allua pNHA	001065	14.4km	Areas of alluvial woodland occur to the east of Inchigeelagh. Small islands in the braided river channel support Alder (*Alnus glutinosa*), birch (*Betula* spp.), willow, Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), occasional oak, Ivy (*Hedera helix*) and Ramsons (*Allium ursinum*). A small population of Freshwater Pearl Mussels occurs in the permanent channels between these islands.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Prohus Wood pNHA	001248	9.7km	This site is a very young wood derived from widespread clearance about forty years ago (1986). The site has not developed much habitat diversity but is developing quite naturally and is of local importance. Birch (*Betula* sp.), Oak (*Querus* sp.) and Holly (*Ilex aquifolium*) are frequent, with some Willows (*Salix* sp.) and Alder (*Alnus glutinosa*) beside streams. At the lower edge thickets of Blackthorn (*Prunus spinosa*) and Hawthorn (*Crateagus monogyna*) occur with some Hazel (*Corylus avellana*).	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Glashgarriff River pNHA	001055	4.9km	Otters use this site, a species listed under Annex II of the E.U. Habitats Directive as it is threatened in the E.U. Badgers also occur here – this species is internationally important and is listed in the Irish Red Data Book. This site includes one of the few waterfalls in the county. The flora of ferns and nonflowering plants in the glen are of interest. The presence of two protected mammal species adds further importance to the site.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.

10.3.2 Flora and Fauna (Desktop Information)

Protected / Rare Species

The National Biodiversity Data Centre (NBDC) online database[2] was searched for records within and surrounding the site; it was searched for information on protected habitats and species known from the 2km grid squares W37R and W37S within which the site is located. Bat records within 2km of the survey area were also reviewed using the NBDC website. The records returned, dated within the last 35 years, are presented in Table 10-4 below.

Table 10-4: NBDC Database Rare and Protected Flora and Fauna

Species name	Grid square	Date of last record	Source	Designation
Eurasian Badger *(Meles meles)*	W37R	02/06/2016	Mammals of Ireland 2016-2025	Wildlife Acts
Eurasian Badger	W373738[1]	2015	Badger Setts of Ireland Database	Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	W37R	31/12/2012	Irish Squirrel Survey 2012	Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	W37R	03/05/2016	Mammals of Ireland 2016-2025	Wildlife Acts

[1] Record from the townland of Knockarranaun to the northeast of Ummera.

The absence of recent records of species from the NBDC database does not necessarily mean that it does not occur within the area, rather it has not formally been recorded as present. In addition, there are records older than 10 years for Eurasian Badger (*Meles meles*) (2006).

A data request for scientific data was summited to the NPWS for all rare/protected species; rare protected plant data; commonage areas; habitat maps and freshwater pear mussel records. The result of this request can be found in Table 10-5 below.

Table 10-5: NPWS Data Request

Taxon Common Name	Taxon Latin Name	10km Grid Square	Sample Date	Survey Name
Barn Owl	*Tyto alba*	W37	April 2009	Barn Owl Project
Barn Owl	*Tyto alba*	W37	July 2009	Barn Owl Project
Barn Owl	*Tyto alba*	W37	August 2009	Barn Owl Project
Common Frog	*Rana temporaria*	W37	September 2009	Frog IPCC data from National Frog Survey 2011
Common Frog	*Rana temporaria*	W37	March 2010	Frog IPCC data from National Frog Survey 2011
Mudwort	*Limosella aquatica*	W47	September 2014	Miscellaneous Plant Records (2015)

As detailed in Table 10-5 Mudwort (*Limosella aquatica*) was recorded within the 2km grid square of the site. These records largely relate to records from the Gearagh, to the southwest of Ummera. Mudwort is afforded legal protection in Ireland and is listed on the Flora (Protection) Order, 2015. Mudwort is described as being *of least concern* in relation to its conservation status within Ireland (Wyse-Jackson *et al*., 2016).

The NPWS data request included a GIS shapefile of FWPM records in the Lee catchment. However, due to the sensitivity of this species, this data is not included in Table 10-5 or any subsequent figures in this report; FWPM are, however, recorded in the River Laney downstream of the site.

A search of Bat Conservation Ireland's database was conducted to identify locations of bat roosts in the vicinity of Ummera. The mid-point of the site was taken as W070388. There are no known bat roosts listed within 1km of Ummera gravel pit (refer to Appendix 10-1).

[2] https://maps.biodiversityireland.ie/

When the search was extended to 10km from Ummera there were a total of 48 roosts located within the wider area. It was found that apart from roosts at a private residence at Rylane, a Ruined Cottage at Annahalla, Kilmichael, and Rockgrove House Outbuilding, Coachford (11 / 12 years ago) all other records are between 15 and 20 years old. The current status of these roosts is unknown.

Protected Habitats and Species Reported Under Article 17
Under Article 11 of the EU Habitats Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes to the Directive and under Article 17, to report to the European Commission every six years on their status. NPWS data on annexed habitats were reviewed; there are no records of Article 17 habitats located within the site (i.e. no habitats listed on Annex I of the EU Habitats Directive occur on site).

Annex I Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] has been recorded downstream of the Ummera site (NPWS, 2013).This habitat was recorded on a number of sites found on the banks of the Sullane-Lee inland delta which is referred to as 'the Gearagh' downstream of Macroom (Conaghan & Fuller, 2018). The Ummera gravel pit and connected water courses is also located within a 10km potential distribution grids squares for water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 3260. However, due to the categorisation of this habitat type the potential distribution covers the entire country therefore this is not a clear indication of presence within the project's ZoI.

NWPS Article 17 data details the distribution of otter and FWPM within the catchment of the River Laney.

Aquatic Ecology
Surface Water/ Water Quality
On viewing the EPA map view, there are no flowing watercourses running through the active gravel pit. The Curraghanearla Stream (EPA Code: 19C86) flows in a westerly direction to the north of the site, parallel with the local road bounding the active gravel pit. The Curraghanearla stream joins the Clashavoon Stream (EPA name – Bealick Stream) at the northern boundary of the gravel pit. After this confluence the Clashovoon Stream flows in a southerly direction along the western boundary of the site.

A small unnamed stream flows north from the elevated farmland to the south of the gravel pit. It flows through the old farmyard at the south-western corner of the landholding and then follows along the proposed S37L site boundary to the southwestern, under the L-3423, discharging to the Laney River. This stream is not registered on EPA mapping (See Figure 7-2).

The Clashavoon Stream is a 3rd order stream and lies in the Sullane Water Framework Directive (WFD) sub catchment (Sullane_SC_020). The watercourse flows in a south-westerly direction, flowing under a local road, before joining the Laney River (EPA Seg Code: 19_1880) and subsequently the Sullane River. The Sullane then flows into the Carrigadrohid Reservoir meeting waters flowing out from the Gearagh SAC and SPA / the River Lee. The River Lee flows in an eastward direction through the Inniscarra Reservoir, before finally entering transitional waters at Cork City and flowing out into Cork Harbour.

The Clashavoon Stream is not sampled under the EPA's national river monitoring programme; however, the River Laney is sampled by the EPA. EPA sampling stations are located upstream and downstream of the Clashavoon – Laney confluence. The downstream station was last sampled 2018 and was assigned a biological water quality status of Q4-5; denoting unpolluted waters of satisfactory condition and high ecological status. In recent times the river scored Moderate status for three consecutive samples from 2012-2016; only improving lately in 2018.
Approximately 2.4km upstream the Laney-Clashavoon confluence the Laney has been sampled by the EPA. This sample site has been scored Q3-4 (Moderate) in recent times (see Table 10-7). The reduction in Q-values upstream of the confluence would suggest the upper sections of the Laney are experiencing other pressures; the Ummera gravel pit has no connection to this river section.

Surface Water and Settlement Features

Presently the by-product of gravel washing at the site flows through a series of settlement ponds. Water is circulated within the ponds were water is pumped from the western pond back into the washing plant and back into the eastern pond. This is also topped up by water from the Clashavoon Stream. An emergency overflow pond is located on the west side of the site, south of the site access to road. In the event of heavy rainfall this pond will take overflow from settlement ponds. Currently this overflow pond does not have an outfall. Due to the capacity of the pond outflow here will be infrequent, only discharging periodically during prolonged periods of high rainfall via over-ground flow. See Chapters 2 and 7 for further details on flows and capacity details for settlement features at Ummera gravel pit. See Figure 7-2 for an illustration of the surface water drainage system.

A now decommissioned U-shaped settlement feature is located on the western side of road (see Figure 2-1; Site Layout Drawing). Due to upgrade works at the site no water from the site enters this settlement feature now.

The surface water runoff from the site flows to the roadside drain which flows to the Laney River (See Figure 7-2). The discharge point is located approximately 40m downstream of the Clashavoon Stream – River Laney confluence.

Table 10-6: WFD SW Monitoring of Waterbodies within Area (2007-2018)

Waterbody	Waterbody Code	WFD Status 2007-2009	WFD Status 2010-2012	WFD Status 2010-2015	WFD Status 2013-2018
LANEY_030	IE_SW_19L010400	High	High	High	High
LANEY_040	IE_SW_19L010500	High	High	High	Good
Carrigdrohid	IE_SW_19_139	Good	Moderate	Poor	Moderate

Table 10-7: Q-Value recorded on the R. Laney River – 1973- 2018

Year	Q-Value	Status	Q-Value	Status
	09L010400 R. Laney; upstream of Clashavoon confluence		09L010500 R. Laney; downstream of site	
2007	3-4	Moderate	4	Good
2010	3-4	Moderate	4	Good
2012	3-4	Moderate	3-4	Moderate
2013	3-4	Moderate	3-4	Moderate
2016	3-4	Moderate	3-4	Moderate
2018			4-5	High

Note – Data refers to EPA Segment: 19_2242.

Physical-chemical water monitoring results provided by KGEC in 2019 detailed no significant difference between samples taken up and downstream of the gravel pit. Results are provided in Table 10-8 below. Sampling points are shown on Figure 7-2.

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Table 10-8: Physio-Chemical Results of 2019 Monitoring

Parameter	Units	Sample ID								
		SW1*			SW2*			SW3*		
		28/5/19	02/7/19	5/11/19	28/5/19	02/7/19	5/11/19	28/05/19	02/7/19	5/11/19
Ammonia (NH3)	mg/l, N	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	mg/l, N	5.1	5.56	3.63	5.2	5.56	3.77	2.3	2.4	2.41
Nitrite	mg/l, N	0.008	---	0.017	0.002	---	0.0173	0.003	---	<0.0152
Orthophosphate	mg/l, P	<0.1	<0.1	0.0294	<0.1	<0.1	0.03	<0.1	<0.02	<0.02
Orthophosphate	mg/l, PO4	---	0.108	---	---	<0.1	---	---	<0.1	---
BOD	mg/l	<4	<1	1.15	<4	<1	1.18	<4	<1	1.4
DO	O2 (mg/l)	10.05	---	10.6	10.22	---	10.9	10.27	---	10.6
TSS	mg/l	<10	<2	<2	18	<2	<2	16	<2	2.45
pH	pH Units	7.41	---	7.67	7.2	---	7.68	7.38	---	7.43
Total Nitrogen	mg/l, N	5.55	---	4.03	5.69	---	4.15	2.88	---	2.62
Total Phosphorous	mg/l, P	<0.1	---	0.0556	<0.1	---	0.0574	<0.1	---	0.0393

Notes:
*SW1: Clashavoon Stream, upstream of gravel pit.
**SW2: Clashavoon Stream, downstream of original settlement ponds at bridge.
***SW3: Laney River, downstream of gravel pit and downstream of drain discharge to river.

Groundwater/ Groundwater Quality
The site is located within the Ballinhassig West groundwater body. The site is located within an area of 'High Vulnerability'. On review of the WFD Groundwater designation presented by the EPA the waterbody was found to be Good status (Table 10-9). Groundwater monitoring results provided by the EPA found the waterbody to be Good status. Groundwater seepage from the existing gravel pit drains through the central area of the extraction void. It percolates back into the gravel deposit or site, passes through a series of small ponds before discharging to a roadside drain. This drain is culverted under the public road and discharges to the Laney River.

Groundwater within the wider Ballinhassig West groundwater body has been classified as being of good status since 2007[3].

Table 10-9: WFD Groundwater Monitoring of Waterbodies (2007-2018)

Ground Waterbody	Code	WFD Status 2007-2012	WFD Status 2010-2015	WFD Status 2013-2018
Ballinhassig West	Ballinhassig West	Good	Good	Good

Aquatic Habitats and Species
Settlement ponds are located within the northern section of the site. Amphibians such as common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) are known to use quarry ponds (Meehan, 2013); while ponds such as those on-site can provide suitable habitat for these species, silt levels are such that they are unlikely to be currently used. A small unnamed stream flows along the south-western boundary; this stream is not mapped due to its limited potential to host aquatic species.

As noted above the Clashavoon Stream is partial situated along the northern / western site boundary. Within the project zone of influence, the Clashavoon Stream and connected waterbodies hold the greatest potential to host surface water dependant habitats and species. The Sullane, of which the River Laney is a tributary, is located within the River Lee catchment and is under the management of the ESB. The establishment of two dams downstream of Macroom at Carraigadrohid and Inniscarra in the 1950's resulted in salmon stocks reducing significantly. The impact of the scheme was immediate and was related to water quality (large quantities of decomposing vegetation causing deoxygenation), discharging to the lower river from the newly flooded reservoirs upstream of Carrigadrohid and Inniscarra. Within five years of construction, the River Lee stock of salmon had collapsed (ESB, 2013). A hatchery has operated at Carrigadrohid since 1956 releasing smolt and parr downstream of Inniscarra dam.

The River Laney was noted to support good stocks of brown trout (*Salmo trutta*) and with high levels of biodiversity noted in the N22 Baile Bhuirne – Macroom EIS (McCarty Hyder, 2009). The Laney is not sampled for fish species under IFI WFD monitoring. A 2014 IFI report describes the Sullane as a riffle and glide dominated habitat, over a substrate of cobble and gravel. Brown trout was the most abundant species recorded, with salmon the second most frequently encountered; minnow, stone loach and 3-spined stickleback were also recorded during electro-fishing at the Sullane Bridge (125926 074028). The Sullane River scored Good for ecological status for 2014 WFD monitoring (Kelly *et al*., 2014).

In 2005, IFI found that fish stocks in the Inniscarra Reservoir were dominated by a large population of small to medium sized bream (*Abramis brama*), with healthy stocks of perch (*Perca fluviatilis*), roach x bream hybrids (*Abramis brama* x *Rutilus rutilus*), with rudd (*Scardinius erythrophthalmus*) and pike (*Esox lucius*) also present. IFI sampling carried out at the Inniscarra Reservoir in August 2015 found Perch was the most abundant fish species recorded, followed by roach, roach x bream hybrids, bream, gudgeon (*Gobio gobio*), eels (*Anguilla anguilla*), brown trout, pike and small numbers of salmon (*Salmo salar*) (Kelly *et al*., 2015). Brook lamprey (*Lampetra planeri*) has been recorded as spawning in the Sullane (Kurz and Costello, 1999).

There are no records for Freshwater White-clawed Crayfish (*Austropotamobius pallipes*) from the Sullane catchment. Crayfish tend to occupy river systems located in limestone catchments; due to the bedrock at Ummera it is very unlikely populations of crayfish occur here (Demers *et al*. 2005).

[3] Groundwater Quality Status https://www.catchments.ie/maps/

Freshwater pearl mussel (Margaritifera margaritifera)
The waterbodies draining the site are located within the Lee Lower *Margaritifera* Sensitive Area - designated by NPWS as a catchment of other extant populations[4], meaning there are known records of FWPM in this catchment. FWPM is protected under the Wildlife Act (1970-2000) and then secondly, as an Annex II & V species under the Habitats Directive and is extremely vulnerable to deterioration in water quality.

NPWS records indicate a small population of FWPM downstream of the gravel pit on the main channel of the River Laney (Segment Code: 19_1880) just downstream of the Clashavoon – Laney confluence (Source: NPWS Dataset Accessed 2020). No FWPM were noted on the section of the Clashavoon, which runs along the western / northern boundary of the gravel pit, during site surveys for this assessment.

Downstream, live populations of FWPM were recorded between 1987-2006 at the Laney-Sullane confluence (Source: NPWS dataset); however, during field survey work in 2007 by E. Moorkens, only dead shells were found here. A survey was carried out in 2018 along the proposed N22 corridor which included the site of the Laney-Sullane confluence. The surveyor found no mussels at this location; however the survey effort terminated at the Laney Bridge and did not extend into the upper reach of the watercourse were live mussels have been recorded in the past (Hibernica, 2018).

Invasive Species
Non-native invasive species should be considered as a potential risk to ecological diversity on site and its environs. The European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 detail the legal context regarding the introduction and dispersal of certain non-native invasive plants and animals. Section 49 and 50 of the Regulations specify that it is an offence to disperse or spread any plant species or associated vector material listed on the 3rd Schedule of the Regulations.

No species listed under the 2011 Regulations were recorded within the 2km grid square (W37R and WS75) on the National Biodiversity Data Centre database. The closest stand of Japanese knotweed (*Fallopia japonica*) recorded on the NBDC database was in 2018 at Gearagh, Garranereagh, Co. Cork (W329707).

10.3.3 Field Survey Results

Habitats within Section 37L (S37L) Boundary
The habitats within the Site (i.e. area considered for this application for under Section 37L of the Planning and Development (Amendment) (No. 2) Regulations are shown on Figure 10-4 and are individually described and evaluated in the following text. The Site's boundary is featured here as a continuous red line and referred to Site Boundary within the text. The approach to determining ecological importance of the Site is set out in Section 10.2 and is based on CIEEM (2018) guidance.

Active Quarries and Mines (ED4)
This habitat was recorded within the gravel pit around the areas of active gravel extraction, recently deposited heaps of sorted aggregate and spoil along with active tracks and set down areas (see Plate 10-1). ED4 was found to be the most extensive semi-natural habitat on site. The active quarry habitat also contained a large washing / screening plant and loading bays. No vegetation was recorded in this habitat due to the high rates of disturbance. This habitat is of ***negligible ecological significance***. However, active Sand martin (*Riparia riparia*) nest burrow clusters were located at 2 no. locations within the active southern faces on the southern side of the gravel pit; with nests also noted east of the washing plant on an inactive face.

[4] http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=2fae3c393baa4b79b7dfb1e3c19f3fab

Plate 10-1: Active Quarry Habitat

Spoil and Bare Ground (ED2)

This habitat was recorded within the western section of the Site in the form of an access road to the gravel pit from the public road and unvegetated spoil heaps – see Plate 10-2. The roadway was c. 4 m wide and was made of gravel. The habitat was not vegetated due to the regular traffic from the site.

Recently a small section of Scrub (WS1) land was excavated to install the new emergency overflow pond at the site, forming an open exposed trench along the sites access road (See Plate 10-2). Given water will only enter this pond when the current settlement ponds reach maximum capacity and much of the water entering this pond will be filtered through the gravely soil substrate it thought this habitat will largely remain dry and therefore ED2 in the short-term. While in the medium to long-term sections of standing water (FL8) may well form, with recolonising bare ground (ED3) and transitional scrub forming along the pond banks and dryer sections. Furthermore, during these improvement works are the site an additional pond has been added to the existing settlement pond complex located in the north of the site. While this pond was filled with water from the washing propose the adjoining areas of the pond are now bare ground (ED2) habitat which will in the medium to long-term from recolonising bare ground.

Spoil and Bare Ground (ED2) onsite is a man-made habitat which supports little to no ecological receptors and is of ***negligible ecological significance***.

Plate 10-2: Bare Ground Habitat

Recolonising Bare Ground (ED3)

During the July and December 2019 surveys this habitat was frequently recorded across the gravel pit in the form of spoil heaps and other areas of low disturbance within the site where vegetation has begun to recolonise the exposed /disturbed surfaces. The resulting vegetation was diverse and flower-rich and supported a range of invertebrate species. The spoil heaps to the north of the site compound supported the following species: - frequent common ragwort and heath speedwell along with occasional selfheal, white clover, common centaury, creeping thistle, bramble, greater birds-foot-trefoil, gorse, grey willow, alder, Yorkshire fog, sweet vernal grass, common bent grass, trailing and St John's-wort. Rosebay willowherb, spear thistle, downy birch, sheep sorrel and heartsease

occurred rarely. Springy Turf-moss (*Rhytidiadelphus squarrosus*) was abundant in places along with lichen species. The presence of sapling tree species along with bramble and gorse indicates some of this habitat is under succession to scrub in the absence of any further disturbance this habitat is denoted as WS1 Scrub - ED3 Recolonising bare ground on the habitat map.

Plate 10-3: Recolonising Bare Ground

ED3 habitat was recorded in the southern side of the site in the form of a bank along the edge of the active face of the gravel pit. Creeping thistle, Common ramping fumitory, curled dock, false oat grass and fat hen were frequently recorded. Yorkshire fog, prickly sow thistle, redshank, nettle, common ragwort, creeping buttercup, spear thistle, thyme-leaved speedwell, heartsease, common chickweed, common mouse-ear, black bindweed and knotgrass (*Polygonum* sp.) were occasionally recorded. Shepherd's purse and heath groundsel were rarely recorded.

Plate 10-4: Recolonising Bare Ground

This habitat was also recorded in the northern side of the gravel pit where a large settlement pond had dried out and the former bed of the pond is being recolonised by plants. Common ragwort and horsetail (*Equisetum* sp.) were frequently recorded along with American willowherb. Yorkshire fog, prickly sow thistle, marsh ragwort and hoary willowherb were recorded occasionally. Curled dock, reed canary grass and great willowherb occurred rarely. As part of routine operations, the pond has since been cleaned out and filled with water. These habitats are transient in nature depending on ongoing quarrying operations.

Plate 10-5: Recolonising Bare Ground Habitat

The recolonising bare ground host common species not listed as rare, but which provide a semi-natural habitat which is of some local importance for wildlife and therefore this habitat is classified as local importance (lower value). A third Sand martin colony was located on an inactive quarry face on the eastern side of the gravel pit. Potential importance for nesting Sand Martin is discussed is Section 10.6.4.

Depositing River (FW2)

The Clashavoon Stream (Plate 10-6) forms part of the western margin of the S37L application boundary. The stream was found to have a wetted width of c. 4 m and had a pool-riffle-glide morphology. The riverbed consisted of 20 percent boulder, 30 percent cobbles, 40 percent gravels and 10 percent fine sediment. During the site visit, the water level and flow rates were relatively high for the channel. The riparian vegetation was willow dominated dry woodland. This habitat is of ***County importance*** due to its potential to host otter (listed on Annex II of the Habitat Directive) as well as other species such as salmonids – i.e. brown trout.

Plate 10-6: Depositing Lowland River (FW2)

Drainage Ditch (FW4)

During the December 2019 survey a small drain (Plate 10-7) was recorded along the edge of the public road southwest of the gravel pit entrance and along the main entrance track to the gravel pit.

The entrance track and roadside drain was c. 3 cm wide and 5-10 cm deep and carried surface water from the gravel pit and public road to the southwest along the road before crossing under the road via culvert into a deeper drain (c. 2 m deep, c. 1 m wetted width) with more slow moving/standing water on the western side of the road which eventually flowed to the River Laney. This drain has limited potential for aquatic species or habitat and likely dries; it was not flowing during the July 2019 survey. This a man-made drain which supports little to no ecological receptors and is of ***negligible ecological significance***.

Plate 10-7: Drainage Ditch (FW4)

Other Artificial Lakes and Ponds (FL8)

This habitat was recorded within the northern and western section of the gravel pit during the July and December 2019 surveys. A large pond used to settle out fine sediment is located close to the northern boundary of the site. During the July site visit, the water was judged to be c. 1 to 2m at the deepest section of the pond and sediment laden. No floating vegetation was observed on the pond.

Plate 10-8: Western Settlement Pond (July 2019)

A second smaller settlement pond is located within the north-western section of the gravel pit; this was dry when viewed in the July 2019 survey and subsequently flooded at the time of the December site visit. No aquatic vegetation was recorded here. This habitat is denoted as ED3 Recolonising bare ground - FL8 Other artificial lakes in the Habitat Map; Figure 10-4.

A third smaller area of ponding surface water was also noted. This was found to be dry the July 2019 survey and filled with c. 10 - 30 cm during the December 2019 survey. This habitat is denoted as ED3 Recolonising bare ground - FL8 Other artificial lakes on the Habitat Map; Figure 10-4

Since the 2019 site surveys were undertaken, works to improve surface water retention on site took place. During these works an additional settlement pond was added to the pond complex in the northern section of the site; this is located to the east of the existing ponds. Also, the second large pond located in the northern section of the gravel pit was split into two ponds. These works removed ED2 habitat and filled the pond with water from the washing plant. While the new pond is consistent with pond habitat (FL8), its adjoining areas now bare ground (ED2). Given the nature of site it is thought the adjoining areas of the new pond will regenerate with species found within the seed bank of the site will once again colonise the area forming Recolonising Bare Ground (ED3).

Given that these ponds have ongoing maintenance requirements with water being continuously recirculation, the water levels fluctuate and with high levels of silt present, the potential for colonisation of plants and species within the ponds is limited.

While the settlement ponds did not support notable aquatic vegetation, standing waterbodies are generally scarce in the agricultural landscape of Cork. When lightly used or restored, such habitats can provide important forging habitat for bats; as well as habitat for invertebrates, amphibians and birds. Such habitat is therefore of ***local importance (lower value).*** However, in their current state they are of **negligible value** (see Plate 10-9).

Plate 10-9: Western Settlement Pond (December 2019)

Scrub (WS1)

This habitat was recorded across the site and wider landholding (see below) with frequent gorse and bramble along with occasional bracken, grey willow and downy birch. A large area of scrub within the site boundary occurs in the north and western sections of the site, around the edge of the active gravel pit, and where areas of spoil have been left undisturbed. Most of the scrub on site is ca. 3m high and dense.

Isolated sections of less dense scrub were also noted within the southern and eastern section of the site growing within areas of recolonising bare ground (WS1/ED3). Scrub is common within the environs of the site and it does provide cover and potential nesting habitat for birds and therefore it is classified as being of ***local ecological importance (lower value*)**.

Plate 10-10: Scrub Habitat

Scrub was also recorded south of the site access road and (Plate 10-11) and consisted of frequent grey willow and bramble along with occasional gorse. Bracken and immature alder trees were recorded occasionally. A single mature Sessile oak was recorded. Nearby bramble and bracken dominated scrub encroached around the margins of the neutral grassland habitat. Soft rush, yellow flag and Yorkshire fog were also occasionally recorded in the latter. Scrub is common within the environs of the site; however, it does provide cover and potential nesting habitat for birds and therefore it is classified as being of ***local ecological importance (lower value*)**. Note this habitat is located in the area proposed for further extraction.

Plate 10-11: Scrub Adjacent to the Clashavoon Stream

Another area of scrub was recorded within the S37L boundary north of the ruined farmyard complex (within the south-west corner of the study area) and continued down slope and north to the road. The species present consisted of abundant bramble and bracken as well as frequent nettle. Common hogweed, ivy, ground ivy and gorse were recorded occasionally. Creeping buttercup, germander speedwell and scattered bushes of hawthorn, elder, semi mature ash and downy birch were recorded rarely.

While, such scrub is common in the local area, it is of value as it forms an ecological corridor, connecting the site and the Clashavoon Stream / Laney River valley where this habitat is considered to be ***local ecological importance (higher value*)**. Note examples of this habitat is located in the area proposed for further extraction.

Plate 10-12: Bracken Scrub Habitat
Note - WD1 woodland in background

WD1 (Mixed) Broadleaved Woodland
A northern spur of WD1 woodland was located along the public road to the east. Ash was recorded occasionally with holly and hawthorn bushes recorded frequently along with occasional elder. Bramble and nettle were frequent in the field layer along with abundant ivy. (See Plate 10-2 above). Note this habitat not located in the area proposed for further extraction.

During the December 2019 survey a second area of mixed broadleaved woodland (WD1) was recorded outside the gravel pit; around the ruined farmyard to the west

Willow Dominated Dry Woodland (WN)
Three instances of this habitat were recorded within the site boundary; two wooded areas east of the public road - these areas were located on dry, steeply sloping and uneven ground; a third area of native woodland was found on the opposite side (west) of the public road on the bank of the Clashavoon River.

The two wooded areas east of the public road consisted of abundant grey willow along with occasional alder. Downy birch, sycamore and ash occurred rarely. These trees were semi-mature and grew to ca. 6m to 8m tall. The field layer contained frequent bramble, bracken, ivy and nettle. A range of species were recorded occasionally in the field layer, including gorse, greater woodrush, honeysuckle, wood avens, broad buckler fern, creeping buttercup, thyme-leaved speedwell, harts-tongue fern, wood speedwell, bugle and scaly male fern. Common figwort, common ragwort, gorse, selfheal and wood sage occurred rarely.

This habitat does not fit well with any semi-natural woodland categories outlined in Fossitt (2000); it appears to be a successional stage from willow scrub to more open woodland; the ground flora does, however, show some affinities with WN1 / WN2; most likely due to the young age of the woodland. The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife. It is therefore considered to be of ***local importance (higher value).*** This habitat is also of importance for bats as it has been identified as excellent foraging site for bat communing through the Clashavoon Stream / Laney River valley; as it makes up a part of a linear habitat connected to the River Laney (this is discussed below).

Plate 10-13: Willow Dominated Dry Woodland (WN)

Plate 10-14: Willow Dominated Dry Woodland (WN)

The third and largest area of native woodland is located along the Clashavoon Stream, west of the public road. This area of woodland consists of frequent grey willow and occasional alder in the canopy along with rarely occurring elder, hawthorn and immature ash in the understory. The field layer includes abundant bramble and frequent ivy. Given this woodland and associated settlement feature (see FL8 habitat below) were established as part of the extraction operations in the late 1970's it would suggest that it should be classified as modified broad-leafed woodland (WD1). However, the ground flora found within this habitat is more typical of native woodland (WN), suggesting that a more natural woodland has become established over time.

Harts-tongue fern, scaly male fern, soft shield fern, broad buckler fern and great horsetail were recorded occasionally. Nettle, wood avens, opposite-leaved golden saxifrage, soft rush, greater woodrush and creeping buttercup were recorded rarely. A settlement pond is located within the habitat with the woodland habitat growing on raised banks (ca. 1-2 m) around this structure. No inundation or flooding from the Clashavoon stream is likely to occur as the adjacent bank rises steeply from the stream edge and the ground level stands ca. 5-6 m above the water level. The trees in the woodland grew to c. 10-15 m high and were all of similar age class.

The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife. It is therefore considered to be of local importance (higher value). This habitat holds importance for bats as it has been identified as excellent foraging / commuting area for bats in the valley of the Clashavoon Stream / River Laney.

Plate 10-15: Willow Dominated Dry Woodland (WN) West of Clashavoon Stream

Wet Willow-Alder-Ash Woodland (WN6)

A small area of this habitat was recorded just within the northern side of the site boundary adjacent to the settlement pond. Alder was abundant along with occasional grey willow. Ash was recorded rarely. The field layer consists of frequent bramble, soft rush and creeping buttercup. Wood horsetail and wood speedwell were frequently recorded along with occasional nettle, wood avens and cleavers. Drainage ditches (FS4) ca. 1m deep with pipes from the settlement ponds were observed in the habitat. The trees were semi-mature growing to ca. 10 m in height. The pattern and age class of the trees indicates that the trees in this habitat may have been planted to provide screening of the gravel pit from the public road.

This habitat did not correspond to the 'Alluvial forests' (91E0) priority habitat listed on Annex I of the EU Habitats Directive as it does not contain sufficient positive indicator species, as well as the uniform age class of the trees present and absence of mature or dead trees (based on monitoring criteria outlined by Perrin *et al*., 2008). The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife namely foraging and nesting birds. It is therefore considered to be of **local importance (higher value).** This habitat holds importance for bats as it has been identified as excellent foraging / commuting area for bats in the valley of the Clashavoon Stream / River Laney.

Plate 10-16: Wet Willow-Alder-Ash Woodland Habitat

Hedgerow (WL1)

A length of hedgerow was recorded along the southern S37L site application boundary; it is separated from the active gravel pit by an area of dry meadow (as shown on Plate 10-17). The species present were bracken which was abundant along with frequent bramble and occasional elder and blackthorn. This feature is not species-rich and is of limited intrinsic ecological value; however, it is some local importance for local wildlife and forms an ecological link between the site and the valley of the Clashavoon Stream / River Laney. It is considered to be of ***local importance (higher value).*** Note this habitat is also the forms part of the southern land ownership boundary.

Plate 10-17: Hedgerow near the Southern Site Boundary

Treeline (i) (WL2)

A treeline was recorded on the southern and western side of the study site where mature ash and sycamore where recorded frequently along with poplar (*Populus* sp.); elder and hawthorn were recorded rarely. This treeline grew to ca. 20 m high. Along the boundary of the ruined farmyard the species present included sycamore, which was dominant in the treeline, and ash which was rarely recorded. Blackthorn grew frequently under the treeline along with elder and hawthorn which occurred rarely. The mature trees grew ca. 15-20 m high. Note this habitat is partially located in the area proposed for further extraction.

This habitat continues outside the S37L boundary forming the part of the land ownership boundary to the south.

Plate 10-18: Treeline along the Eastern Side of the Site

The treeline named above continues east, re-joining the S37L boundary, where it bounds a small cottage to the south of the site. This treeline comprised of similar composition the tree line above where blackthorn features along with elder and hawthorn occurring rarely. The mature trees grew ca. 15-20 m high and continues along the ditch forming the land ownership boundary.

Treeline (ii) (WL2)

A section of treeline was recorded within the S37L application boundary at the northeast corner of the site; separated from the gravel pit by an area of dry meadow. This habitat consists of abundant semi-mature sycamore and leyland cypress along with occasional ash. Blackthorn was recorded frequently growing beneath the mature trees. The trees grew to a height of ca. 10 m. Note this habitat is partially inside S37L boundary as it continues along the land ownership boundary to its north-eastern corner. While such habitat is common in the local area, here both treelines are of value as they form an ecological corridor, connecting the southern section of the site and the Clashavoon Stream / Laney river valley. It is considered to be of ***local importance (higher value).*** Bats were found to forage around the southern treeline (see below for commentary on significance for bat species).

Plate 10-19: Treeline along the North-eastern Side of the Site

Dry Meadows and Grassy Verges (GS2)

This habitat was recorded within the southern section of the site boundary. The species present included abundant false oat grass along with frequent creeping thistle. Common bent grass, Yorkshire fog, common ragwort, creeping buttercup, common mouse-ear and patches of cut leaved cranes-bill were recorded occasionally. Sweet vernal grass, germander speedwell, cocksfoot, common hogweed, white clover and tufted vetch were recorded rarely. The sward was high (c. 60 cm), coarse and lodged in places. During the December 2019 site visit it was noted this field had been cut for silage.

The habitat does not correspond to the 'lowland hay meadows' (6510) habitats listed on Annex I of the EU Habitats Directive due to the absence of high-quality indicator species, insufficient numbers of positive indicator species and excessive cover of negative indicator species based on the monitoring criteria set out in the Irish semi-natural grasslands survey 2007-2012. This is a semi-natural habitat comprised of non-threated plants species, however it is a habitat which hosts foraging areas for invertebrates and mammals and is of high biodiversity in a local context with a high degree of naturalness. Therefore, it is of ***local importance (higher value).*** Note this habitat is located in the area proposed for further extraction.

Plate 10-20: Dry Meadows and Grassy Verges Habitat

Wet grassland (GS4)

A small area of wet grassland was recorded within the S37L site boundary, within the dry meadow habitat, south of the active gravel pit, close to the adjacent cottage. Soft rush, sweet vernal grass, common bent grass, and Yorkshire fog were recorded frequently. Greater birds-foot-trefoil and jointed rush were recorded occasionally. White clover was recorded rarely. This semi-natural habitat comprised of species common to the area and it serves as a foraging area for local invertebrates and birds. Therefore, is of **local importance (higher value).** Note this habitat is located in the area proposed for further extraction.

Plate 10-21: Wet Grassland Habitat

Neutral Grassland (GS1)

This habitat was recorded within the southwest corner of the S37L boundary north of the ruined farmhouse and farmyard. The species present included abundant Yorkshire fog, frequent creeping bent grass along with occasional false oat grass. Red fescue was rarely recorded. Creeping buttercup and creeping thistle were recorded frequently. Common ragwort, common nettle, common sorrel and germander speedwell were recorded occasionally. Soft rush, common mouse ear and white clover were recorded rarely.

Areas of disturbed soil due to extensive rabbit burrowing within the field contained field woodrush, ribwort plantain and sheep sorrel. The sward varied between small areas of short cropped vegetation from rabbit grazing but was mostly longer rank areas which were ca. 40 cm high and were lodged and/or tussocky. A change in ground levels in the field indicates that this area may have been used for small scale aggregate extraction in the past. The habitat is species poor and contains indicator species of agricultural improvement (common mouse ear and white clover; O'Neill *et al*., 2013) and enrichment (nettle). It is likely that this field was previously improved/semi-improved for agriculture when the adjacent farmyard was more active but has now become rank and unimproved in the absence of any management. Scrub habitat was recorded encroaching around the edges of the field. No recent management was observed with rabbit grazing the sole evidence of any recent grazing. As a result of past patterns of land use, this habitat did not fit well with the semi-natural grassland habitats listed in Fossitt (2000); it has been classified as neutral grassland due to the absence of a mowing regime within the habitat in contrast to the field adjacent to the active gravel pit which is mown for silage bales annually. This habitat contains common species and is a semi-natural habitat of some local importance; it is considered to be of ***local Importance (lower value).*** Note this habitat is located in the area proposed for further extraction.

Plate 10-22: Neutral Grassland (GS1)

Remaining Habitats within the Land Ownership

In line with best practice the lands adjacent to the Section S37L site boundary, but within the ownership boundary were surveyed and habitats recorded. The following section details the habitats recorded outside of S37L boundary but within the ownership of DWCL.

Depositing Lowland River (FW2)

As noted above the Clashavoon Stream forms part of the western boundary of the S37L application. The Curraghanearla Stream forms the north-eastern section of the land ownership boundary where its joins the Clashavoon and forms the remaining section of the north and western land ownership boundary. It was found that the Clashavoon Stream has a wetted width of c. 4 m and had a pool-riffle-glide morphology. The riverbed consisted of 20 percent boulder, 30 percent cobbles, 40 percent gravels and 10 percent fine sediment. During the site visit, the water level and flow rates were relatively high for the channel.

The riparian vegetation to the southwest was found to be willow dominated dry woodland, treeline, scrub and wet grassland on the eastern and southern side of the stream. Along the bank to the northeast the Curraghanearla Stream was bound by grassland to the south and improved grassland to the north. This habitat is of County importance due to its potential to host salmon and otter (species lists Annex II of the Habitat Directive and Wilf Acts).

Mixed Broadleaved Woodland (WD1)

This habitat was recorded immediately outside the gravel pit to the northeast. During the July 2019 survey this habitat was found to consist of frequent downy birch and sycamore with occasional grey willow and ash. This woodland consisted of semi-mature trees growing to c. 8 to 10 m with occasional mature oak (*Quercus* sp.) and ash growing to c. 20 m along the public roadside. This habitat does not contain rare or threated species, nor is it important at a regional level[5]. It does, however, act as an important ecological corridor in the Clashavoon Stream / Laney River corridor; and has been identified an important foraging / commuting area of bats. It is therefore considered to be of ***local importance (higher value).*** Note this habitat is outside the S37L boundary but is within the land ownership boundary.

During the December 2019 survey a second area of mixed broadleaved woodland (WD1) was recorded outside the gravel pit; around the ruined farmyard at the southwest corner of the landholding. Here, sycamore was recorded abundantly, in various age classes from sapling to mature. Note this habitat is located outside the S37L application boundary but within the DWCL land ownership boundary.

[5] County Cork Biodiversity Action Plan 2009-2014.

A third section of WD1 woodland was located on the southern section of the public road (to the northwest of the ruined farmyard, and contiguous with woodland around the farm). Ash was recorded occasionally and a small copse of mature sitka spruce was recorded on the northern boundary of the former farmyard complex. Holly and hawthorn bushes were recorded rarely along with occasional elder. Bramble and nettle were frequent in the field layer along with abundant ivy. Broad buckler fern, creeping buttercup, germander speedwell, ground ivy, navelwort, herb-robert, harts-tongue fern, scaly male fern, common hogweed and lesser celandine were recorded occasionally. Foxglove, common ragwort, wood avens and opposite leaved golden saxifrage were recorded rarely. Note this habitat is located outside the red line boundary but within the DWCL land ownership boundary.

A range of ruined and dilapidated stone dwelling and outbuildings as well as corrugated farm sheds were located within this area of scattered trees. The habitat consists of common species of tree and ground flora; is an area of semi-natural habitat of some local importance foraging and nesting birds; forms an ecological corridor with the Laney within other features adjacent to it and therefore considered to be of ***local importance (higher value).*** This habitat lies outside the active gravel pit and outside the proposed further development area.

Plate 10-23: Mixed Broadleaved Woodland

Hedgerow (WL2)

A hedgerow was recorded along the northern margin of the wet grassland field in the north of the study site. This hedgerow consisted of frequent hawthorn and bramble as well as occasional grey willow. The bushes were ca. 4-5 m high. This feature is not species-rich and is of limited intrinsic ecological value however it has some local importance for local wildlife and forms an ecological link between the site and the valley of the Clashavoon Stream / River Laney. It is considered to be of ***local importance (higher value).*** Note this habitat is outside the S37L boundary but is within the landownership boundary.

Plate 10-24: Hedgerow near the Northern Site Boundary

Treeline (i) (WL2)

This treeline is a continuation of the treeline found within the southern boundary of the S37L area which forms the boundary of the ruined farmyard. Here the species present included sycamore, which was dominant in the treeline, and ash, poplar (*Populus* sp.), elder and hawthorn were recorded rarely. This treeline grew to ca. 20 m high. Note this habitat is outside the S37L boundary but is within the landownership boundary. It is considered to be of ***local importance (higher value).***

Plate 10-25: Treeline on Southern Boundary

Treeline (iii) (WL2)

A third treeline was recorded adjacent to the Clashavoon Stream on the northern side of the study site and consisted of mature alder trees which were dominant. Immature ash trees occurred rarely. The trees were ca. 10-15 m high. Note this habitat is outside the S37L boundary but is within the landownership boundary. While such habitat is common in the local area, here the treeline is of value as they form an ecological corridor, connecting the northern section of the site and the Clashavoon Stream / Laney River valley. It is considered to be of ***local importance (higher value).***

Plate 10-26: Treeline Adjacent to the Clashavoon

Scrub (WS1)

Two areas of scrub located outside the S37L boundary were recorded 1) adjacent to the cottage at the southern site boundary and 2) within the north-eastern corner of the land ownership. This habitat consisted of bracken, which was dominant, and blackthorn which occurred occasionally. Scrub is common within the environs of the site; however, it does provide cover and potential nesting habitat for birds and therefore it is classified as being of ***local ecological importance (lower value*)**.

Plate 10-27: Bracken Scrub Habitat

10.3.4 Summary of Habitats within the Gravel Pit

Habitats within the S37L Site Boundary
While the entire landholding has been surveyed for completeness, the following habitat features are located within lands the subject of the S37L application (see Habitat Map - Figure 10-4):

- Active Quarries and Mines (ED4)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Depositing lowland river (FW2)
- Drainage ditch (FW4)
- Other artificial lakes and ponds (FL8)
- Scrub (WS1)
- (Mixed) broadleaved woodland (WD1)
- Willow Dominated Dry Woodland (WN)
- Wet willow-alder-ash woodland (WN6)
- Hedgerow (WN1)
- Treeline (WL2)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Neutral Grassland (GS1)

Summary of habitats located within the proposed further extraction area, under the S37L application:

- Scrub (WS1)
- Hedgerow (WN1)
- Treeline (i) (WL2)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Neutral Grassland (GS1)
- (Mixed) broadleaved woodland (WD1)

Recolonising bare ground (ED3) located on the fringes of the existing gravel pit are categorised as being of local importance (lower value). The remaining habitat are considered to be of local importance lower and higher value.

Summary of remaining habitats within the ownership of DWCL
The following habitat features are located outside the S37L application area but within the land ownership: -

- Mixed broadleaved woodland (WD1)
- Dry meadows and grassy verges (GS2)
- Hedgerow (WL2)
- Treeline (WL2)
- Scrub (WS1)
- Wet grassland (GS4)
- Depositing lowland river (FW2)

Lands adjoining the proposed S37L site include a diverse range of semi-natural habitats – including dry meadows and grassy verges (GS2); Mixed broadleaved woodland (WD1); wet grassland (GS4); Depositing lowland river (FW2) which are categorised as being of ***local ecological importance (higher value).*** The Curraghanearla and Clashavoon streams forming the northern and western boundaries are of ***County Importance***.

10.3.5 Invasive / Non-native species

No invasive plant species listed on the 2011 Regulations were recorded on site.

Single butterfly-bush (*Buddleia*) and Russian Comfrey (*Symphytum* x *uplandicum*) plants were reported within the site. Although, butterfly-bush is a considered medium impact invasive species, neither of these species are listed under the 2011 Regulations; furthermore, butterfly-bush flowers are valuable sources of nectar for butterflies.

During the December 2019 survey Montbretia *(Crocosmia X crocosmiflora)* was found on the bank at the edge of the entrance track into gravel pit while Cherry Laurel *(Prunus laurocerasus)* was recorded growing next to the ruined farmhouse. While neither species is listed under Schedule 3 of the Natural Habitats Regulations 2011, Montbretia is considered a medium impact invasive species and Cherry Laurel is listed as a High Impact[6] invasive species.

The locations of invasive / non-native species found on site are listed in Table 10-10.

Table 10-10: Location of invasive species not listed on the 2011 Regulations

Species	E_ITM	N_ITM	Notes
Buddleia	537109	573982	Single plant c. 1.5 m high within gravel pit next to access road.
Russian Comfrey	536997	573682	Single plant in field adjacent to cottage in the southern side of site
Montbretia	536881	573890	On bank at edge of entrance track into gravel pit
Cherry Laurel	536840	573604	Growing next to ruined farmhouse

10.3.6 Fauna

Birds
Birds seen or heard during the walkover survey in June 2019 and December 2019 were noted. The diversity of bird species on both survey days was good. The bird species observed on site are listed in Table 10-11.

[6] https://www.biodiversityireland.ie/wordpress/wpcontent/uploads/Invasives_taggedlist_HighImpact_2013RA-1.pdf

Table 10-11: Bird Species Recorded on Site

Species	Notes
Rook	Recorded July 2019 and December 2019.
Goldcrest	Recorded December 2019.
Dunnock	Recorded December 2019.
Redwing	Recorded December 2019.
Redpoll	Recorded December 2019.
Hooded crow	Recorded December 2019.
Goldfinch	Recorded December 2019.
Coal tit	Recorded December 2019.
Woodcock	2 no. birds flushed at separate locations from woodland between public road and Clashavoon Stream where settlement feature is located during the December 2019 site visit.
Sand Martin	See coordinates below of active nest burrow clusters in active quarry face on southern side of gravel pit. Recorded July 2019.
Wren	Recorded July 2019 and December 2019.
Curlew	11 birds in recently cut silage field south of site. Flew off to south. Recorded July 2019.
Willow warbler	Recorded July 2019.
Blue tit	Recorded July 2019 and December 2019.
Chaffinch	Recorded July 2019 and December 2019.
Long tailed tit	Recorded July 2019 and December 2019.
Blackcap	Recorded July 2019.
Redpoll	Recorded July 2019.
Lesser black-backed gull	Flying over and adjacent to site. Recorded July 2019.
Swallow	Recorded July 2019.
Robin	Recorded July 2019 and December 2019.
Kestrel	2 birds flying through the site. Not seen again. Recorded July 2019.
Pheasant	Recorded July 2019.
Pied wagtail	Recorded July 2019 and December 2019.
Blackbird	Recorded July 2019 and December 2019.
Woodpigeon	Recorded July 2019 and December 2019.
Siskin	Recorded July 2019.
Mallard	Female flying in from west, appeared to land in the vicinity of the settlement pond. Recorded July 2019.
Linnet	Recorded July 2019.
Sparrowhawk	Hunting on the south eastern side of the site. Near to sand martin colonies. Recorded July 2019.
Buzzard	Soaring over site. Recorded July 2019.
Magpie	Recorded July 2019 and December 2019.
Great tit	Recorded July 2019 and December 2019.
Additional Notes:	
3 no. Sand Martin Colonies were reported at the following locations: – 537109 E 573812 N – 537153 E 573814 N – 537173 E 573896 N	

Species	Notes
 Example of Sand Martin Colonies at the site	

While Woodcock in on the red list of birds of conservation concern (Colhoun and Cummins, 2013), this is for birds breeding in Ireland. There is a large influx of wintering birds to Ireland which are not red listed; the birds seen at Ummera were recorded in December 2019. Curlew are also on the red list as breeding birds; there is no evidence of Curlew breeding in the area. The birds observed in July 2019 were most likely a field feeding flock which may have been migrating through the area.

The majority of birds noted are not of conservation concern (Green listed); while Goldcrest, Sand martin, Lesser-black backed gull, Sparrowhawk, Swallow and Robin are amber listed.

The site is considered to be of ***local importance (higher value) for birds.***

Mammals

As part of the habitat survey, the field surveyor looked out for signs of mammals, notably badger setts within areas of cover, notably the adjoining hedges, where setts can often occur in the Irish agricultural landscape. Abundant rabbit sign (droppings, burrows, tracks) in area of woodland close to ruined farmhouses and adjacent grassland habitat was recorded during the December 2019 survey. No badger setts were recorded during the December survey. No observations/evidence of Wildlife Act/ European Habitats Directive protected species were noted.

No signs of otter were found on site. Otter is widespread within Ireland and it is likely that they may use the watercourse to forage. The left bank of the Clashavoon stream provides suitable riparian cover for a potential otter holt, however no otter holts were recorded at or between the two macroinvertebrate sampling sites. Overall, the site is rated as poor to moderate for otter. Otter have been recorded at on the River Laney both upstream and downstream of the Clashavoon – Laney confluence.

Details of the mammal survey are provided in Table 10-12.

Table 10-12: Mammal Signs / Species Recorded on Site

Species	E_ITM	N_ITM	Notes
Mammal burrow (prob. Rabbit or fox)	537015	573688	Fresh, partly excavated tunnel. Narrows significantly and possibly terminates quickly below ground. Fox droppings at entrance and nearby in field.
Mammal burrow (prob. rabbit)	536930	573962	Large c. 50 cm entrance. C. 30 cm burrow into soft sand. Prints in sand into entrance. Probable Rabbit. Live animals seen in immediate vicinity. No evidence of badger recorded.
Fox	536973	574052	Droppings on bed of dried out settlement pond.

The site is considered to be of **local importance (lower value)** for terrestrial mammals.

Bats

During an emergence watch at the site office and farm buildings on the southern boundary of the land holding (i.e. adjoining, but just outside the site) no bat activity was recorded (see Appendix 10-1). The farmhouse to the southwest was not surveyed at this time; it is separated from the gravel pit by trees / woodland and is not affected by ongoing works.

During the walked transects through the site, several Soprano and Common pipistrelles were recorded over the grass field to the south of the gravel pit and along the mature treeline on the south-western boundary of the site.

The dawn survey reported low levels of foraging activity. Soprano and Common pipistrelles were recorded along the mature tree line. No swarming was detected, and no bats returned to roost in the trees prior to sunrise. The bat survey report is included in full in Appendix 10-1.

Results of Songmeter recordings

- Songmeter at settlement pond – Total no. of calls = 142 calls.
    - 48.6% Common pipistrelle; 23.2% Soprano pipistrelle; 11.3% Brown long-eared; 9.8% Leisler's; 7% Whiskered/Daubenton's.
- Songmeter on track – Total number of calls = 32.
    - 65.63% Common pipistrelle; 31.25% Leisler's; 3.13% Soprano pipistrelle.

Relatively low levels of overnight bat activity were recorded on the Songmeter placed at the settlement pond and very low levels of bat activity at the central location of the gravel pit. Ummera gravel pit is not an important foraging site for bats. However, the study found there are excellent foraging sites for bats along the route of the River Laney and the Clashavoon Stream very close to the western and northern boundary of the site. These watercourses have mature deciduous wood land along their banks.

Amphibians
As noted above in Table 10-5 Common Frog has been located within the 2km grid square around the site. Froglets were recorded in wet grassland habitat near the abandoned farmyard (ITM: 506744 538606) and wet grassland habitat near spoil heaps (ITM: 506403 / 538569). These grasslands are not located within the active gravel pit. Frogs are common in Ireland and given the low numbers found within the site, this site is of local importance (lower value) for amphibians. The ponds within the gravel pit provides sub-optimal habitat for Smooth Newt. Given the high sediment content it is unlikely frogs will use this habitat to breed.

10.3.7 Aquatic Ecology

Site 1
Site 1 is located downstream of the surface water abstraction point. The sampling site is located approximately 30m upstream of the bridge over the Clashavoon Stream. The left (eastern) riverbank is a steep bank approximately 5-6m in height, which is part of a broadleaved wooded area. The wooded area is dominated by willow and alder trees with an understorey of ferns, bramble and ivy. The right (western) riverbank is an agricultural field used for grazing animals. There is fencing along the top of the riverbank with little to no riparian margin present. Grasses, nettle and bramble were present.

The river was 2.5m wide on average and sampling depth was 10 - 20cm. Substrate type in order of dominance was fine gravel, sand, gravel, cobble and silt. Siltation was slight mid-channel with siltation levels moderate at the margins of the channel. In slow flowing areas and pools upstream of site 1, siltation was moderate across the channel. Siltation was evident on marginal vegetation within these areas.

Site 1 was characterised by a riffle - glide sequence, comprising 80% fast glide and 20% riffle. No filamentous algae were recorded at the site. Hemlock water-dropwort (*Oenanthe crocata*) was present.

The contents of the kick sample contained a significant amount of fine detritus material. It is possible that this material is as a result of decaying algal growths during the summer months.

All taxa recorded at the site and their abundances, as defined in the SSRS methodology, are listed in Table 10-13.

Table 10-13: Site 1 Macroinvertebrate Taxa List

Taxon	Relative Abundance Class
Ecdyonurus sp.	2
Leuctra sp.	1
Hydropsychidae	1
Rhyacophilidae	1
Sericostomadidae	1
Glossosomatidae	2
Goeridae	1
Chironomidae	1
Simuliidae	2
Tipulidae	2

Taxon	Relative Abundance Class
Ancylus fluviatilis	1
Sphaeriidae	1
Lumbricidae	1
Lumbriculidae	2
Elmidae (adults)	1
Elmidae (larvae)	2
Gammarus duebeni	4
Baetis rhodani	3

Plate 10-28: Site 1: Sampling Site Downstream of Abstraction Point

Surface Water Abstraction Point

The abstraction point and pumphouse are located on the left (eastern) bank of the Clashavoon Stream. A man-made weir is located immediately downstream of the abstraction point that comprises a number of large boulders. A pool is present along the left bank where the abstraction of surface water occurs. The weir results in a backwater in the Clashavoon Stream for a short stretch upstream of the weir. At the time of sampling, the water of the Clashavoon Stream was clear.

Plate 10-29: Man-made Weir on Clashavoon Stream

Plate 10-30: Pumphouse and SW Abstraction Point

Site 2

Site 2 is located upstream of the surface water abstraction point. Site 2 is located approximately 200m upstream of the weir to ensure that backwater effects were not impacting the macroinvertebrate assemblage. The surrounding environment at this site is very similar to Site 1.

The left riverbank is a stone wall that essentially acts as a retaining wall for the adjacent road. The stone wall is covered in bramble, ferns and guelder rose. The right riverbank is an agricultural field for grazing animals, which is the same field that borders Site 1. There is fencing along the top of the riverbank with little to no riparian margin present. Grasses, nettle, bramble and a hawthorn tree were present.

The river was 2.5m wide on average and sampling depth was 20cm. Substrate type in order of dominance was sand, fine gravel, gravel, cobble and silt. Some of the cobbles were embedded. Siltation was slight within the channel.

The site was characterised by a riffle - glide sequence, comprising 50% fast glide and 50% riffle. No filamentous algae were recorded at the site.

The contents of the kick sample contained a notable amount of fine detritus material, however less than that encountered in the sample at Site 1. It is possible that this material is as a result of decaying algal growths during the summer months.

All taxa recorded at the site and their abundances, as defined in the SSRS methodology, are listed in Table 10-14.

Table 10-14: Site 2 Macroinvertebrate Taxa List

Taxon	Relative Abundance Class
Ecdyonurus sp.	2
Perlodidae	1
Hydropsychidae	2
Rhyacophilidae	1
Glossosomatidae	2
Goeridae	2
Chironomidae	1
Simuliidae	2
Tipulidae	2
Ancylus fluviatilis	2
Sphaeriidae	1
Lumbricidae	1
Lumbriculidae	2
Elmidae (adults)	1
Elmidae (larvae)	2
Gammarus duebeni	4
Baetis rhodani	3

Plate 10.31 Site 2 Sampling Site

Small Stream Risk Scores

SSRS indicates the likelihood of a stream in achieving its Water Framework Directive objectives of 'good' status and thus, the final SSR score can be one of 'Probably not at risk', 'Indeterminate stream may be at risk', or 'Stream at risk'.

The SSRS values for each site are detailed below. The greater value a SSR score is, the less risk associated with that stream not obtaining its WFD objective of 'good' status. As can be seen from Table 10-15, both sites are categorised as being 'at risk'.

Table 10-15: Small Stream Risk Scores

Site No.	SSR score	Category
Site 1	6.4	Stream at risk
Site 2	6.4	Stream at risk

The Clashavoon Stream flows through an agricultural landscape with one-off single residential houses. This landscape setting can result in pressures such as increased riverbank instability and erosion, sedimentation and anthropogenic nutrient inputs that lead to eutrophication (Magette *et al*., 2007; Kelly Quinn *et al*., 2016).

The sampling sites upstream and downstream of the surface water abstraction point are very similar in channel characteristics and macroinvertebrate community composition, with SSR scores the same for both sites. Both sites are categorised as 'at risk', demonstrating that the river is experiencing pressures upstream of the gravel pit.

The main difference between the two sites is the amount of detritus material present in the samples and siltation within the channel. Both factors were greater at the downstream sampling site. Although the increase of these factors was not expressed in the macroinvertebrate community of Site 1, it is possible that the gradient and flow type of the Clashavoon Stream may be compensating for any potential effects from the discharge within the Clashavoon Stream.

The nature of the detritus material in the samples suggests that it is decaying algal material and it is possible that the river experiences algal blooms during summer months when flows are lower and instream temperatures are elevated. County Cork experienced significant rainfall during September and October 2019 and thus, the system would have been flushed out considerably during the 2 months prior to sampling.

Salmonids
The Clashavoon Stream hosts limited valuable adult and juvenile salmonid habitat. As noted above brown trout have been recorded within the Laney and therefore salmonids may enter the Clashavoon Stream, however the presence of the man-made weir is a likely obstruction to fish movements. The substrate composition of fine gravels, sand and moderate siltation presented poor adult salmon spawning habitat with no large accumulations of clean gravels or redds recorded. Some moderate juvenile habitat was present downstream of the man-made weir with small shaded pools present. However, the stream consisted mostly of fast glide and riffle flows with a moderate gradient. As stated, the presence of adult or juvenile salmonids upstream of the man-made weir is unlikely due to the weir acting as an obstruction to fish movements.

Lamprey
The absence of abundant slow-moving pools with silt laden substrates provides poor nursery habitat for juvenile lamprey in the Clashavoon Stream. Similarly, to salmonids, lamprey require physical unobstructed passage upstream through the waterbody. The presence of the man-made weir forms an obstruction to migratory adult and juvenile lamprey. Furthermore, the lack of clean gravel substrates limits the potential of lamprey spawning habitat to poor within the Clashavoon Stream.

Freshwater pearl mussel
The Clashavoon Stream does not provide optimal juvenile and adult FWPM habitat. The area of habitat adult and juvenile mussels can occupy and the area of spawning and nursery habitats the host fish can occupy are closely linked. Fish nursery habitat typically overlaps with FWPM habitat. The presence of sand and fine gravels present in the Clashavoon Stream presents an unstable substrate, limits FWPM's ability to anchor into the riverbed.

Water quality data is not collected on the Clashavoon Stream by the EPA. Small stream risk scores calculated as part of this study for sampling stations upstream and downstream of the gravel pit both indicate that the Clashavoon Stream is at Risk of not achieving Good status (i.e. SSR scores, based on sampling of aquatic macroinvertebrates). EPA water quality data (Q-values) is presented from stations on the River Laney upstream and downstream of the confluence with the Clashavoon. These data suggest that water quality downstream of the gravel pit broadly mirror those of the upstream station on the River Laney; with the worst case of water quality (Q2-3, Poor in 1995) noted on the River Laney upstream of the gravel pit. Currently water quality downstream of the gravel pit is Q4-5, High (2018). While negative impacts on the Clashavoon Stream have been noted, in for example correspondence, from the Fisheries Board, these data also highlight broader patterns of negative impacts on water quality in the catchment of the River Laney since 1973.

FWPM have been recorded in the River Laney. Apart from limited records there does not appear to have been a systematic survey of FWPM within the full catchment of the River Laney. It is not known if the River Laney FWPM population is a recruiting population. There was no evidence of FWPM in the Clashavoon Stream (2019 field surveys). As noted there have been negative pressures on water quality in the wider River Laney catchment; these together with release of silt from the gravel pit could have had negative impacts on FWPM within the river. However, it is not possible to identify the relative scale of impact associated with different pressures in the absence of historic data (i.e. agriculture, forestry, septic tanks, road runoff, quarrying etc.). As noted, a series of changes to the water management system and patterns of water abstraction have been implemented on site since the 1980s with recent improvements providing a closed system for recirculating wash water.

Crayfish
Crayfish are not known from the River Lee catchment.

10.4 Impact Assessment

The potential impacts arising from the further development at the Ummera gravel pit including extension of extraction area are discussed in the following sections.

10.4.1 Do Nothing Impact

In the absence of further development, the potential value of the footprint of the proposed project to species such as nesting birds, foraging mammals and commuting bats would increase, provided that the linear landscape features (treelines) would not be lost due to other forms of development intensification of the existing agriculture practices. It is assumed that the area to be developed to the south of the existing gravel pit will remain in low intensive agriculture. The levels of biodiversity will be static in the short term. In the long term, given the cessation of operations is planned at the gravel pit and the restoration of thee site to agricultural lands there would be a positive effect to some groups of local birds, foraging mammals and commuting bats using the restored lands and losses to other groups which would have favoured habitats within the active gravel pit.

10.4.2 Potential Impacts of the Development

In the absence of existing site management and mitigation measures the proposed project could have a range of potential impacts on the ecological receptors within the zone of influence due to further operation at the gravel pit. The following are examples of categories of impacts generally caused during gravel extraction activities.

Physical Damage/ Habitat Loss
Physical damage includes the degradation, modification, fragmentation or loss of habitats. Direct physical damage of habitats will occur within working areas of the proposed project. Physical damage of habitats can also be an indirect impact and could occur, for example, through the introduction of fine sediments into an aquatic system, causing changes to the particle composition of the benthic habitats. Physical damage may be temporary or permanent in nature.

Disturbance
Disturbance can cause sensitive species to deviate from their normal and preferred behaviour, resulting in stress and increased energy expenditure. Disturbance can result in species being displaced from suitable habitat areas that provide areas for feeding and foraging, commuting routes, and resting and breeding sites. Physical disturbance of species can also result in direct mortalities of species and thus, disturbance impacts can be both direct and indirect and may be temporary or permanent in nature. Examples of direct disturbance includes activities such as damage to a breeding or resting site of a protected species, e.g. a bat roost, badger sett or otter holt (where these occur). Indirect disturbance may result from the presence of personnel on site during opening hours, noise emanating from the gravel pit etc.

Changes in Water Quality
The release of pollutants to water can impact upon the relevant waterbodies and the species they support. This can result in impacts such as increased turbidity of the water column, a reduction in photosynthesis, contribution to eutrophication and changes to the species composition of the system as a result. The degree of impact depends on the type of pollutant released and the nature of the receiving receptor. For example, the release of fine sediments to a stream or river is likely to cause siltation of the river bed and interrupt the functioning of species, from aquatic plants to macroinvertebrates to fish, and larger predators that depend on these biotic groups as a food supply, e.g. otter and kingfisher. Impacts to water quality could be temporary in the form of surface water runoff, or permanent in the form of a continued discharge impacting negatively on the receiving environment.

Dispersal of Invasive Species
Non-native invasive species can have negative impacts on biodiversity. Negative impacts of non-native invasive species on native biota occur through competition, predation, herbivory, habitat alteration, disease and genetic effects such as hybridisation. The main impacts arising from the presence of non-native invasive species include a reduction in species diversity due to dense plant growth, heavy shading and disruption of trophic levels. These species can potentially be spread via plant fragments and soil containing plant material, and by vectors such as machinery and personnel.

10.4.3 Impact on Sites Designated for Nature Conservation

European Sites
The gravel pit at Ummera is not located within or immediately adjoining a European Natura 2000 site; i.e. a Special Area of Conservation or a Special Protection Area for birds.

The Gearagh SAC (000108) (c. 3.5km southwest) and The Gearagh SPA (004019) (4.6km southwest) are both located upstream of Ummera on the main channel of the River Lee. Surface waters from the gravel pit at Ummera enter the Clashavoon Stream, a tributary of the River Laney. The River Laney in turn joins the River Sullane upstream of where it meets the River Lee, in the Sullane Delta. There is not hydraulic connection with The Gearagh SAC or The Gearagh SPA.

The Gearagh SAC is designated for floating river vegetation [3260]; rivers with muddy banks [3270]; Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]; Alluvial forests [91E0] and Otter (*Lutra lutra*) [1355]. Ummera gravel pit does not overlap with the Gearagh SAC; none of the habitats within the SAC would have been, or are currently being, impacted by works at Ummera. Furthermore, none of these habitats have been identified within Ummera gravel pit, or immediately adjoining it. Furthermore, works at the gravel pit would not affect the hydrological regime of the Gearagh which supports such habitats.

Otter are widely distributed within the Lee catchment; and are likely to be using the Clashavoon Stream / River Laney, Sullane River and the River Lee downstream of the site (see e.g. NBDC webviewer). Day-to-day operations of the gravel pit would not have, and currently, do not affect usage of the neighbouring Clashavoon Stream by otter (i.e. works to not limit access to the river; or free passage up / down stream). While otter can use settlement ponds (e.g. Coolbane Quarry, West Cork also operated by DWCL), at present settlement ponds do not provide suitable habitat. However, if the settlement ponds were to be retained as part of restoration of the site, it would provide suitable habitat for otter, as well as fish and amphibians (e.g. Common frog), upon which otter prey.

Furthermore, works at the gravel pit are sufficiently distant from the Gearagh, that bird species for which the SPA have been designated would not be disturbed by traffic, washing activities, etc. and associated noise. In its current condition, the gravel pit does not support habitats that the qualifying interests of the SPA would utilise; however, if the settlement pond were to be retained as part of restoration of the site, Mallard and Coot (and perhaps Teal) would utilise these habitats and be a positive impact on the wider environment.

Due to the distances and lack of connectivity between the gravel pit and the three European sites (listed in Table 10-2 and discussed in Section 10.3.1), no significant effects are likely to occur as a result of the further development of gravel extraction operations.

Sites of National Importance
The gravel pit is not located within or immediately adjoining a site of national importance, i.e. a Natural Heritage Area / proposed Natural Heritage Area. The nearest such site, Lough Gal pNHA (001067) and Glashgarriff River (001055) are located on the Glashgarriff River to the northeast of Ummera. The Glashgarriff River is a short river which discharges to the Lee just below the Carrigadrochid Dam (upriver of Coachford). These are at a significant distance from the gravel pit and it is very unlikely that further development of extraction activities will negatively impacting these sites.

As above, The Gearagh is also proposed for designation as a pNHA (000108); see comments above.

Downstream of the gravel pit the nearest pNHA is the Lee Valley pNHA (000094) located downstream of Inniscarra Dam. This site occupies five separate sections of the River Lee valley, which support a diverse range of terrestrial and aquatic semi-natural habitats. However, the distance between this site and the gravel pit (ca. 30km) is such that it is very unlikely that further development of extraction activities will negatively impact on this pNHA site.

Due to the distances and lack of connectivity between the gravel pit and these pNHAs no significant affects from the further development of extraction activities are predicted.

Other Sites
As noted, the Gearagh is also a Nature Reserve; see comments above. No other sites of County or Local Importance have been identified.

10.4.4 Impacts on Semi-natural Habitats

At present the area within the S37L site boundary supports the following range of habitats:

- Active Quarries and Mines (ED4)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Depositing lowland river (FW2)
- Drainage ditch (FW4)
- Other artificial lakes and ponds (FL8)
- Scrub (WS1)
- (Mixed) broadleaved woodland (WD1)
- Willow Dominated Dry Woodland (WN)
- Wet willow-alder-ash woodland (WN6)
- Hedgerow (WN1)
- Treeline (WL2)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Neutral Grassland (GS1)
- Scrub (WS1)

The gravel pit is dominated by a range of modified habitats directly related to extraction activity – i.e. ED4, ED2, ED3, FW4 and FL8. While some habitats are within the red line boundary they are located in areas that will not be impacted by proposed developments: - e.g. none of the areas of semi-natural woodland on the northern side of the public road (WN) will be impacted. Furthermore, a small area of WN6 (wet woodland) located along the northern side of the gravel pit will not be impacted; nor will the area of adjoining WD1 or the small patch of WD1 alongside the access road. Habitats buffering the northern and western settlement ponds are also to be retained. Pit faces, with sand martin nests, located east of the washing plant are also to be retained.

Of these habitats the following are located within the area identified for further extraction under the proposed S37L application and are therefore likely to be negatively impacted as works progress over time:

- Scrub (WS1)
- Hedgerow (WN1)
- Treeline (i) (WL2)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Neutral Grassland (GS1)
- (Mixed) broadleaved woodland (WD1)

While the balance within the ownership of DWCL supports:

- Mixed broadleaved woodland (WD1)
- Dry meadows and grassy verges (GS2)
- Hedgerow (WL2)
- Treeline (WL2)
- Scrub (WS1)
- Wet grassland (GS4)
- Depositing lowland river (FW2)

Habitats within the existing gravel pit are predominantly of no more than local ecological importance (higher value).

The continuation of gravel extraction at the gravel pit will result in negligible impacts to existing habitats which are dependent on the extraction process e.g. Active Quarries and Mines (ED4); Spoil and Bare Ground (ED2); Recolonising Bare Ground (ED3) and transitional scrub.

Further development of the gravel pit will see extraction continue southward leading to the loss of; Scrub (WS1); Hedgerow (WN1); Treeline (i) (WL2); Dry meadows and grassy verges (GS2); Wet grassland (GS4); Neutral Grassland (GS1) and Scrub (WS1). While an area of (Mixed) broadleaved woodland (WD1) located on the western boundary is within this proposed extraction area this linear habitat provides screening and is an important corridor for fauna commuting from the Laney River and will therefore be retained. This will most likely include loss of areas of habitat of local ecological value replaced over time with a more diverse mix of semi-natural habitats that currently characterise the site (i.e. a positive impact on biodiversity).

10.4.5 Impacts on Fauna

Birds
The loss of scrub and treeline habitat within the proposed extraction area due to de-vegetation and soil stripping will result in the displacement of bird species to the surrounding area. The proposed landscaping of the site to incorporate additional planting of native species will, however, provide suitable new habitat for most of the commonly occurring bird species associated with the habitats being lost. Furthermore, such scrub habitats are widespread in the wider environment.

As with the removal of vegetation, works to sand martin nesting burrows will be conducted outside the bird nesting season (March 1st – 31st August).

Continued extraction of sand and gravels will expose more areas of vertical sand cliffs / banks that offer suitable nesting habitat for Sand martin. This is a summer visitor to Ireland and feeds on small insects caught in flight, particularly over water (large numbers are recorded feeding in wetland sites such as the Gearagh). As noted, signs of nesting Sand martin were recorded in the summer of 2019, with one location supporting >30 apparently occupied nests. Moving forward, site operations will be managed to include the retention of open pit faces for nesting Sand martin. The impact on birds would therefore be assessed as being Slight negative at the local / site level only.

It is likely that the development of a more varied mix of semi-natural habitats within the gravel pit site will increase the viability of the site, not only as a refuge, but as a viable habitat for a range of birds species common throughout the Irish landscape. For example, 2 no. woodcock were recorded on the woodland west of the road in December 2019; as noted this woodland has developed from planting undertaken in the 1970s and will not be impacted.

The impact on bird species would therefore be assessed as being Slight negative at the local / site level in the short-term. With the establishment of new habitats within the active gravel pit, including pit faces for nesting sand martin, settlement ponds and areas of scrub etc., these short-term impacts would be offset while the gravel pit is still being actively managed.
Non-volant mammals

As with birds, there would be some loss of foraging habitat for terrestrial mammal; however, this is of small scale and involves habitats of local value which are well represented in the local environment. The noise from on-site plant and human presence and activity has the potential to cause disturbance to and displacement of terrestrial mammals and birds. However, the site has operated for some time as a gravel pit, so wildlife in the area has most likely habituated to patterns of activity and associated noise. Furthermore, berms to be constructed around the proposed extension area will further reduce the effects of noise on local wildlife in the wider area.

In the long term the succession and recolonisation of semi-natural habitats on the margins of the gravel pit void will provide a greater diversity of habitats for fauna. The proposed screening berms, which will bound the new extraction area to the south, will in time become colonised with scrub (e.g. gorse) and young woodland; providing cover and refuge for small mammals and birds than would be afforded by agricultural grassland and adjoining hedges; while also providing foraging opportunities and an ecological corridor to the wider Clashavoon Stream / Laney River valley for bats. No badger setts are currently located on site.

The impact on terrestrial mammals would therefore be assessed as being Slight negative at the local / site level only.

Bats
Relatively low levels of bat activity were recorded during the 2019 bat survey within the footprint of further development area. The study did conclude there are excellent foraging sites for bats along the route of the River Laney and the Clashavoon Stream very close to the western and northern boundary of the site. The proposed extraction includes the removal of a small section treeline however the remaining linear habitats located around the site boundary will be retained therefore impacts to commuting bat are not predicted as a result of the proposed extraction. The findings of this survey concluded the proposed further development will have no adverse effect on bats (see Appendix 10-1). The presence of consistent standing water may be of benefit to local wildlife; especially foraging bats by providing local abundances of invertebrate prey in the sheltered micro-climate of the gravel pit base.

The impact on commuting bats would therefore be assessed as being Slight negative at the local / site level only.

Amphibians
No amphibians were recorded during field surveys. Settlement ponds can be used by amphibians including Common frog and Smooth newt. While settlement ponds are present on site, they are being actively used for silt settlement and do not currently provide good habitat for amphibians. If the settlement pond were to be retained in some form as part of restoration of the site, it would provide suitable habitat for a range of species, including amphibians in the longer term.

The impact on amphibians would therefore be assessed as being negligible in the short-term and positive in the long-term if it were possible to retain surface water features in the restored site.

10.4.6 Impacts on Aquatic Ecology / Water Quality

As noted, quarries can inadvertently create clean water habitats that support diverse assemblages of flora and fauna, including amphibians, macrophytes and invertebrates such as beetles, dragonflies and damselflies. The Ummera gravel pit has several functioning settlement ponds which could provide this habitat type. However, given high levels of silt input and maintenance of these ponds this succession is unlikely to occur while the gravel pit is operational. These habitats will therefore stay as negligible value for aquatic ecology during the lifetime of the gravel pit. The ponds will be removed with the restoration of the site.

The most likely threats to the integrity of a watercourse such as the Clashavoon Stream from a sand and gravel pit, such as Ummera, comes from the discharge of contaminated surface

waters; in particular waters heavily contaminated by silts and fines. Other sources of contamination could include hydrocarbon release from refuelling areas or from wastewater associated with welfare facilities on site.

Water quality data is not collected on the Clashavoon Stream by the EPA. Small stream risk scores calculated as part of this study for sampling stations upstream and downstream of the gravel pit both indicate that the Clashavoon Stream is at Risk of not achieving Good status (i.e. SSR scores, based on sampling of aquatic macroinvertebrates). EPA water quality data (Q-values) is presented from stations on the River Laney upstream and downstream of the confluence with the Clashavoon. These data suggest that water quality downstream of the gravel pit broadly mirror those of the upstream station on the River Laney; with the worst case of water quality (Q2-3, Poor in 1995) noted on the River Laney upstream the gravel pit. Currently water quality downstream of the gravel pit is Q4-5, High (2018).

Recently measures have been put in place to improve water management on site with the completion of a closed recirculation system – refer to Chapter 2. Further measures such as the construction of a bunded fuel / oil storage shed, concrete refuelling pad and paving of the site access road will limit further the risk of contaminates reaching the Clashavoon Stream.

FWPM has been recorded in the River Laney. Apart from limited records there does not appear to have been a systematic survey of FWPM within the full catchment of the River Laney (see Section 10.3.7). There was no evidence of FWPM in the Clashavoon Stream (2019 field surveys). The release of silt laden waters from the site could have a significant negative impact on FWPM. However, as noted, a series of improvements to the water management system have been implemented. With careful maintenance and operation of these measures, negative impacts to water quality and sensitive species such as FWPM are not anticipated.

Similarly, salmonids and lamprey are sensitive to release of silts into aquatic environs which has the potential to cause the siltation of spawning gravels preventing spawning; covering of laid eggs and in high concentrations of suspended solids in the water may physically choke fish or disrupt feeding behaviour (Hendry & Cragg-Hine, 2003). As noted, a closed wash-water recirculation system is in operation at the gravel pit. Significant negative impacts on salmonids and lamprey are therefore not anticipated.

10.5 Mitigation Measures

10.5.1 Birds & Mammals

Clearance of vegetation such as scrub will be carried out outside the breeding bird season from 1st March to 31st August inclusive. Where vegetation clearance cannot be avoided during this period the local authority will be consulted in advance and if it is deemed necessary then a suitably qualified ecologist will be appointed to oversee clearance of vegetation and ensure the area is free of nesting birds. The appointed ecologist will develop a method statement for the vegetation clearance in consultation with the planning authority and, if required, local NPWS staff.

While badger was not found within the site, badger could establish setts in the time prior to commencement of works. Therefore, pre-construction surveys for badger will be carried out within the gravel pit extension prior to site clearance. Note that suitable habitat will be installed along the screening berms in the form of native tree planting.

10.5.2 Bats

Working hours at the gravel pit are generally between 9am and 5pm, so artificial lighting is not required; there is no outside lighting at the gravel pit and it is not proposed to install outside lighting for its further development. While it was found that a low number of bats used the site during the 2019 survey, linear habitats to the west were found to be important features for bats commuting up the Laney River valley. The presence of flood lights could interfere with this commuting corridor, but this is avoided by the omission of flood lights in the site design.

10.5.3 Aquatic Fauna

DCWL has an Environmental Management System (EMS) in place for the operation of the Ummera gravel pit. Going forward, monitoring will be conducted during the lifetime of the operations to assess the effects on the environment so that operational changes and improvements can be made where appropriate. The proposed monitoring programme will form part of an EMS for the pit and include both surface and groundwater monitoring. This will have to take account of the presence of FWPM in the River Laney downstream of the site and ensure that the settlement pond system has sufficient capacity to prevent loss of silt laden waters to the Clashavoon Stream and the River Laney.

Recent changes to the water management onsite has reduced the requirement of abstraction from the Clashavoon Stream. Further mitigation to lower the potential for impact to fish and aquatic species will be put in place. Such measures include the placement of a screen around the abstraction point and partial removal of a weir located downstream of the abstraction point. As noted above this weir is a barrier to fish passage. The partial removal of the weir will improve access upstream for salmon and lamprey species.

10.5.4 Water Quality

Best practices measures in line with CIRIA's 'Environmental good practice on site guide (fourth edition) (C741) and Construction Industry Research and Information Association and the IFI's '*Guidelines on protection of fisheries during construction works in and adjacent to water*' will be adhered to.

Furthermore, improvements are proposed for the storage and dispensing of hydrocarbons (potential sources of contaminants). The improvements proposed are:

- A concrete refuelling pad will be installed which will contain any spills during refuelling.
- The storage of fuel and hydrocarbons will be in a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
- Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
- A spill kit will be kept in the front-end loader.

The proposed measures will be carried out within 6 months of the grant of permission.

10.5.5 Invasive Species

No 3rd Schedule of the Natural Habitats Regulations, 2011 invasive species, such as Japanese knotweed, were found on site. Butterfly-bush was recorded during the desktop survey but not found onsite. Butterfly-bush is widespread within Ireland. While Butterfly-bush is classified as a medium risk invasive species, and should be treated appropriately, it is also of great value to pollinators.

Good site hygiene is required to prevent the spread of butterfly-bush and any other invasive species which may occur in the proceeding time since the site was surveyed. Tracked equipment should not be used in areas with non-native invasive species before such species have been cleared. Any areas adjoining the site that support non-native invasive species, but where excavation works are not proposed, but which may have to be accessed by machinery should be protected to avoid spreading the non-native invasive species. Should it be necessary to remove material off-site for disposal this must be done in line with appropriate Waste legislation and with the nature of the material clearly identified

10.6 Residual Impacts

As noted, this assessment relates to impacts from the proposed continuation and further extraction activities at Ummera gravel pit. Based on the assessment of these potential impacts and mitigation measures proposed, the project will have a shot-term negative impact on terrestrial flora and fauna on site.

The further development at the Ummera site will result in the loss of grassland, scrub and a section of treeline. Overall, the impacts of the proposed development in the absence of mitigation would be assessed as no more than slight negative at a local / site level. Mitigation by avoidance is proposed for breeding birds, bats, aquatic fauna and to prevent the spread of invasive species. Measures to reduce the effects of artificial lighting, noise, surface water pollution and loss of habitats are also proposed. Planting of native woody species in landscaped areas is also proposed as mitigation. With careful maintenance and operation of these measures to protect water quality on site, negative impacts to water quality and sensitive species such as salmon, FWPM etc. in the adjoining catchment of the River Laney are not anticipated.

While some short-term residual effects are anticipated due to the loss of habitats while replacement habitat matures it is considered that in the long-term that such losses will be mitigated on site. Furthermore, the improvement of surface water management within the gravel pit, reduction and screening of water abstraction from the Clashavoon Stream and partial removal of the weir will have positive effect on the Clashavoon Stream, the downstream Laney River and fauna using these connected waterbodies.

In all the residual impact of the proposed development is likely to be of no more than slight negative at local / site level.

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Figure 10-1: Special Areas of Conservation within 15km

Figure 10-2: Special Protection Areas within 15km

Figure 10-3: National Heritage Areas within 15km

Figure 10-4: Habitat Map of Ummera Gravel Pit

11. LANDSCAPE AND VISUAL ASSESSMENT

This chapter provides a description of the existing landscape, visual character of the site and its surrounds, and the potential impact of the further development of the gravel pit thereon. The description of the area is based on survey and analysis carried out on site and aerial photography that documents the landscape changes over time. Information regarding the vegetation in the locality is derived from field observations and the biodiversity chapter.

The term landscape refers primarily to the visual appearance of the land, including shape, form and colour, and their interaction to create specific patterns and pictures that are distinctive to particular localities. However, the landscape is not purely a visual phenomenon because its character relies closely on its physiography and its history. Hence, in addition to the scenic and/or visual dimension, there are a whole range of other dimensions, including geology, topography, soils, ecology, archaeology, landscape history, land use, buildings and settlement, architecture, cultural associations and human beings.

11.1 Existing Landscape

The Ummera gravel pit is in a landholding of 20.22ha. The further development of the gravel pit will increase the gravel pit footprint by approximately 2ha. It is in the Laney River catchment on undulating agricultural land within the wider Lee Valley catchment. Surrounding lands are used for intensive agriculture – mainly dairy and beef. Elevations undulate typically between 90 and 200mOD. The site is overlooked from the south and southeast by an east-west trending ridge, which rises to 220mOD. These elevated lands are mostly in grass. Natural woodlands follow the valleys of the Laney and Sullane rivers.

The landscape type for the Ummera area is characterised in the Cork County Landscape Strategy as Valleyed Marginal Middleground (Macroom and Environs) (Type 13a). This landscape type is found between Ballyvourney and Macroom. Ummera is situated at the southeast corner of the landscape type, which is defined by the elevated ridges to the southeast of the gravel pit. The adjoining landscape type to the southeast is Hilly River and Reservoir Valleys (Type 8).

The landscape comprises low rounded hills of Old Red Sandstone enclosing fairly broad undulating river valleys. While there is generally an appearance of roughness in this landscape type, the area in the immediate environs of Ummera are less so, with good quality agricultural land prevailing.

There are three landscape character areas within this landscape type – Kilmichael, Macroom and Ballynagree. Ummera is situated within Macroom – Broad Middle Valley of semi-rugged mosaic hills and rock outcrop, which is located in the centre of the landscape.

The site is not located within a ‘High Value Landscape’ as defined in the 2014 CDP. The high value landscape coincides with the Lee valley to the southeast. The gravel pit is not visible from any of the scenic routes in the wider area. The nearest scenic route is the R618 between Leemount (Carrigrohane) and Macroom (via Coachford).

Due to undulating topography and mature trees, views of the gravel pit are limited; only some overburden stockpiles are visible.

11.2 Scope of Impacts

The Ummera gravel pit has and will continue to have an impact on the landscape and visual character of the surrounding areas, and in the main these impacts will be perceived as negative. Changes will continue to arise primarily from:

- The removal of existing agricultural lands.
- Continued extraction operations.
- Temporary storage of aggregates and silt washings.
- Construction of site infrastructure, such as screening berms.

These changes will impact primarily on residences and roads adjacent to the east side of the gravel pit and the more distant views from the west along local road L-7478. The gravel pit is not considered to have impacts on views from other perspectives.

11.3 Impact Assessment

Visual impact may occur by means of intrusion and/or obstruction where these terms are defined as follows:

Visual Intrusion: Impact on view without blocking, and
Visual Obstruction: Impact on view involving blocking thereof.

Visual impacts by means of intrusion or obstruction on a particular view, may be viewed as positive, neutral or negative and can be rated as follows:

- **Little/None** arises where the development is adequately screened by existing landform, vegetation or built environment.
- **Low** arises where views affected by the development form only a small element in the overall panorama.
- **Moderate** arises where an appreciable segment of the panorama is affected or where there is an intrusion into the foreground.
- **High** arises where the view is significantly affected, obstructed or so dominated by the development as to form the focus of attention.

For the purposes of this appraisal, the visual impact is evaluated when the full extent of the gravel pit footprint is established. It is considered that this represents the visual impact at or near its maximum.

11.4 Impacting Features of the Gravel Pit

11.4.1 Removal of Agricultural Land

The further development area includes the area covered by the substitute consent application, the original settlement ponds and an area of approximately 2ha along the eastern, southern and southwestern perimeter of the landholding. This area is largely grazing land or occupied by temporary screening berms. Of the 20.22ha that make up DCWL's landholding, the further development area extends to 15.5ha. The remainder of the landholding comprises agricultural land and the old farmhouse and farmyard. The latter is surrounded by mature trees and is derelict; the southernmost part of the grazing land (where the gallan stone is located) is not included in the further development area. The agricultural lands are used for silage, with a small area at the north of the landholding (between the road and stream) unused.

The removal of agricultural land has been ongoing since gravel extraction commenced at Ummera. The pit has advanced to the south from the northwest corner since the 1940's. The progress is well documented since 1995 when OSi aerials became available. Aerial photography for 1995, 2000, 2005 and 2018 are provided in Plates 11-1 to 11-4, which demonstrate the progression of gravel extraction. It is apparent from the 1995 and 2000 aerial photographs that internal hedgerows were removed by the farmer (previous owner) during this period.

Plate 11-1: 1995 OSi Aerial Photograph

The 1995 aerial photograph is black & white, so detail is difficult to ascertain. The following is noted:

- The gravel pit occupies 3 or 4 fields, with four large agricultural fields to the south and southeast still used for farming with field boundary hedgerows intact.
- The gravel pit is accessed from the northwest corner. As such, the operations in the gravel pit are in view from this short section of public road.
- The currently used site access is constructed but is believed to be used by the farmer to access the agricultural lands.
- The washing plant is located at the northwest corner of the gravel pit and likely to be in clear view from the public road. Settlement ponds appear to be present to the southwest of the washing plant.
- The northeast corner of the landholding is used for silt deposition.
- The trees along the northern road boundary have been maintained.

Plate 11-2: 2000 OSi Aerial Photograph

The following is noted from the 2000 aerial photograph:

- The gravel pit occupies much the same area as that seen in the 1995 aerial photograph; extraction has moved 20 to 30m to the south.
- The hedgerows in the agricultural fields to the south and southeast have been removed.
- The gravel pit is accessed from the southwest corner, with the entrance at the northwest corner closed off. The berms constructed at the former entrance are not yet vegetated.
- The washing plant has been moved into the gravel pit – to its current location. It would therefore have been less visible from the public road. A settlement pond has been constructed within the gravel pit.
- Vegetation is developing over the silt deposited at the northeast corner of the landholding.
- The trees along the northern road boundary have been maintained and provide good screening. There is a berm along the western boundary with shrubs developing.

Aerials for 2005 and 2018 show a progression of extraction to the south.

Plate 11-3: 2005 OSi Aerial Photograph

Plate 11-4: 2018 Google Aerial Photograph

The removal of agricultural land is long-term, reversible and may be perceived as a negative visual impact. The provision of screening berms, perimeter tree planting and maintaining mature trees around the perimeter of the landholding has softened the visual impact of the progressive loss of grazing land. In the long-term, the extraction area will be restored back to agricultural use. While the removal of agricultural land will be perceived as negative, the mitigation measures that have been implemented will in the long-term have a positive impact for views towards the gravel pit – i.e. the maturing of screen planting at the gravel pit.

11.4.2 Extraction Operations

The area of extraction currently extends to approximately 8ha, increasing steadily since extraction commenced at Ummera, partially demonstrated in Plates 11-1 to 11-4. In the past 30 years, it is estimated that approximately 500,000m^3 of sand and gravel has been removed from the Ummera pit. This is only an estimate as records of loads is not available. An estimated volume of 375,000m^3 (i.e. 750,000 tonnes) will be removed during the further development of the gravel pit over a 15-year period – i.e. approximately 50,000 tonnes/yr.

The principal visual impacts will arise from the removal of soil and grassland as extraction progresses to the south. Near views of the operations will be limited to areas to the east of the gravel pit. The nearest view being from a dwelling to the east, located along the local road that goes around the eastern side of the pit. The visual impact will be greatest when temporary screening berms are constructed around new extraction areas. Until vegetation has established, these berms contrast strongly with the intervening agricultural fields.

11.4.3 Site Infrastructure

Site infrastructure at the gravel pit has been largely unchanged for the past 20 years. It consists of a fixed washing plant and site offices and stores. Since its relocation, this infrastructure isn't visible from the public roads, so has not given rise to visual intrusion. It is proposed to continue the use of this plant at its current location. Addition infrastructure is proposed consisting of a fuel storage shed to replace the existing storage cabin. The shed will be in the yard area and will not be visible from locations outside the pit.

Mobile plant is occasionally visible moving around the pit from some aspects, but this will not give rise to a significant visual intrusion.

11.5 General Impact on Landscape Character

Any change in a land use has a corresponding impact on the landscape character of an area. In this instance, the Ummera gravel pit has formed part of the local landscape for many decades. The gravel pit has steadily expanded from a footprint of approximately 4.2ha (estimated for 1990) to the substitute consent footprint of 10.5ha. This impact is the gradual change from pasture to extraction area. Screening berms and screen planting has been carried out as the gravel pit expanded, along with retaining mature trees, to soften the visual impact.

The degree of impact is strongly dependent on the perceptions of the surrounding population. As the gravel pit operations are well established at the site (DCWL have been established at Ummera since 1978), the perceived impacts have been much less than that of a greenfield site. The continued acceptance of further development at Ummera will be largely dependent on good site management, maintenance of effective screening provided by trees and berms, and control of emissions (namely noise and dust).

11.6 General Impact on Visual Character

The visual impacts can be discussed in terms of the two generalised viewing areas. The first is the views of the site from the low-lying areas to the southwest and west of the site. From these areas, the topography and mature trees along the pit perimeter limit views into the gravel pit. Local road L-3423 runs along the valley of the Laney River as far as the site entrance and then follows the Clashavoon Stream passed the site. The road is boarded by mature trees for most of its length past the site, so views are restricted. The topography rises sharply along the eastern side of the L-3423, so this further restricts views into the site. The clearest views of the gravel pit are for a short section of the L-3423 approaching the site from the north. Views from the west are more open towards the gravel pit. Again however, the mature trees along the western side of the pit and around the original settlement pond provide effective screening. Stockpiles do break the treeline betraying the presence of the gravel pit. However, on balance, the rural character of the area defined by mature trees around farmyards and along the river valleys is not interrupted by the gravel pit and the impact occurring is considered negligible. There will be no change to this magnitude of impact with the further development of the gravel pit. As the trees grow during the lifetime of the gravel pit, they will provide improved screening.

Viewing areas to the east of the site are from local road L-34231-0. This road runs along the northern and eastern perimeter of the site. While the hedgerow is not dense and views into the site are available, the screening berms block views of the processing plant and aggregate stockpiles. The berms do not however block views of the landscape beyond the gravel pit. As such, the rural character of the area is not interrupted by the gravel pit and the impact occurring is considered negligible. With the further development of the gravel pit, the screening berms will come closer to the road, however, they will remain approximately 100m from the road, maintaining a 30m buffer to the gallan stone.

11.7 Photographic Illustration

To assess the visual extent of the gravel pit, a number of photographs were taken from locations in the surrounding area. These selected views illustrate the location and visibility of the gravel pit. The selected locations for photographic illustrations are shown on Figure 11-1 and were:

View 1: From Local Road L-7478 Looking East Toward Gravel Pit
View 2: From Local Road L-3423-20 Looking South Toward Gravel Pit
View 3: From Local Road L-34231-0 Looking North Toward Gravel Pit
View 4: From Farm Lane Looking North

Photographs are provided in Figures 11-2 to 11-5

11.8 Visual Impact on Views from Residence & Roads

Fourteen house locations (i.e. those within 500m of the ownership boundary) were identified for assessment of visual impact. Of these houses, two were considered to have a moderate visual intrusion, 8 have a slight visual intrusion and 5 houses have none (refer to Section 11.3 for explanation of terms).

Two of the houses identified had minor level of visual obstruction. The overall results of the assessment are illustrated in Table 11-1.

Table 11-1: Results of Assessment

Residence Location Reference	View No. where relevant	Distance from S37L boundary (m)	Visual Intrusion	Visual Obstruction
H1	N/A	15	Moderate	Yes (Berm)
H2	N/A	40	Moderate	Yes (Berm)
H3	N/A	50	None	None
H4	N/A	370	None	None
H5	N/A	600	Slight	None
H6	N/A	780	Slight	None
H7	N/A	555	Slight	None
H8	N/A	560	Slight	None
H9	N/A	540	Slight	None
H10	View No. 2	230	Slight	None
H11	N/A	280	Slight	None
H12	N/A	520	None	None
H13	N/A	610	None	None
H14	N/A	645	None	None

Along the local road L3423 to the west of the gravel pit, there are no views into the gravel pit. The topography naturally rises sharply from the road, so it is likely that views of the site have always been obstructed.

For the local road L34231-0 running around the eastern and southern perimeter of the site, the screening berms have progressively moved closer to the road resulting in obstruction of views. While sections of these temporary berms will move closer to the road, the impact will be negligible once vegetation is established.

The further development of the gravel pit will be well screened from local road L-7478. Berm construction will be visible from the southern end of this road, but once vegetation is established, the working in the gravel pit will not be visible. The visual impact will decrease over time from slight to negligible.

11.9 Landscape Plan to Mitigate Visual Impact

DCWL has carried out the following measures to mitigate visual impacts during the lifetime of the gravel pit:

1. Relocation of the washing plant into the gravel pit, screening it from view from public roads and surrounding areas.
2. Construction of perimeter screening berms.
3. Provision of perimeter screen planting and maintaining existing mature boundary trees.

DCWL will restore the gravel pit upon completion of extraction operations. Phased restoration will be carried out where practical; as noted the resource is not homogenous, so suitable material is taken from different placed around the pit. This makes it impractical to delineate areas that will be restored sequentially. Much of the site will be returned to agricultural use, with some areas retained for ecological diversity. These areas will include:

1. The original settlement pond between the road and Clashavoon Stream will be left.
2. Perimeter screen planting will be maintained.
3. A pit face will be retained to provide suitable habitat for Sand martins.

It is noted in the Department Guidelines that '*quarry restoration can not only replace, but may even add to, the diversity of plants and wildlife*'. The aim of the restoration is twofold; 1) to return most of the extraction area to agricultural use as part of a working farm and 2) enhance the local biodiversity by providing a diversity of habitats.

Figure 11-6 shows the final restoration plan for the gravel pit. The restoration of the quarry will take place in several principle phases:

- Construction of perimeter berms and screen planting.
- Restoration of the pit floor to agricultural land following extraction.
- Enhancement of biodiversity.

Perimeter berms will be constructed along the landownership boundary. For the further development of the gravel pit, these will be at the southwest corner of the Section 37L boundary. Perimeter berms have already been constructed along the eastern and south-eastern perimeters. They were purposely kept low to avoid causing visual obstruction to neighbours. Infill tree planting will be carried out were needed. Tree planting will consist of:

- Ash 25%
- Elder 10%
- Sycamore 25%
- Popular 10%
- Irish Oak 15%
- Hawthorn 15%

This planting selection mirrors what is found in the existing treeline and in the wider area.

The temporary screening berms will not be planted with trees and this material will be reused in restoration. The temporary berms will be seeded with grass. Grass will consist of creeping fescue with clover. This will be seeded at a density of an ounce/ m^2. Seeding will preferably be carried out in spring, however it will follow the construction of the berms to ensure that the berms are greened as soon as possible after construction, to minimise erosion.

The restoration of the gravel pit void will have the following elements:

- Removal of plant and equipment. The equipment in the gravel pit may be sold, relocated to another DCWL facility, or removed from site for scrap. This process may take up to two years.
- Restoring the floor of the pit void by the placement of silt, subsoil and topsoil, followed by seeding with grass. This will require reuse of overburden and topsoil stored on site, and the importation of clean soil if there is a deficit. This work will be carried out in the two years following completion of extraction.

Where practical, exhausted extraction areas will be restored on an on-going basis.

The restored gravel pit will form part of the farmed landholding and afterwards subject to normal farm management practices for grassland – fertilized, cut for silage and grazed.

The planting on the perimeter berms will have been established by the time extraction is completed and will be retained. The original settlement pond between the road and Clashavoon Stream will be left to provide biodiversity. Retaining one of the settlement ponds was considered, but was ruled out; it is unlikely that the unlined ponds would not hold water in the long term.

An artist impression of the gravel pit at full extent is provided as Figure 11-7, and an illustration of the restored gravel pit is provided as Figure 11-8.

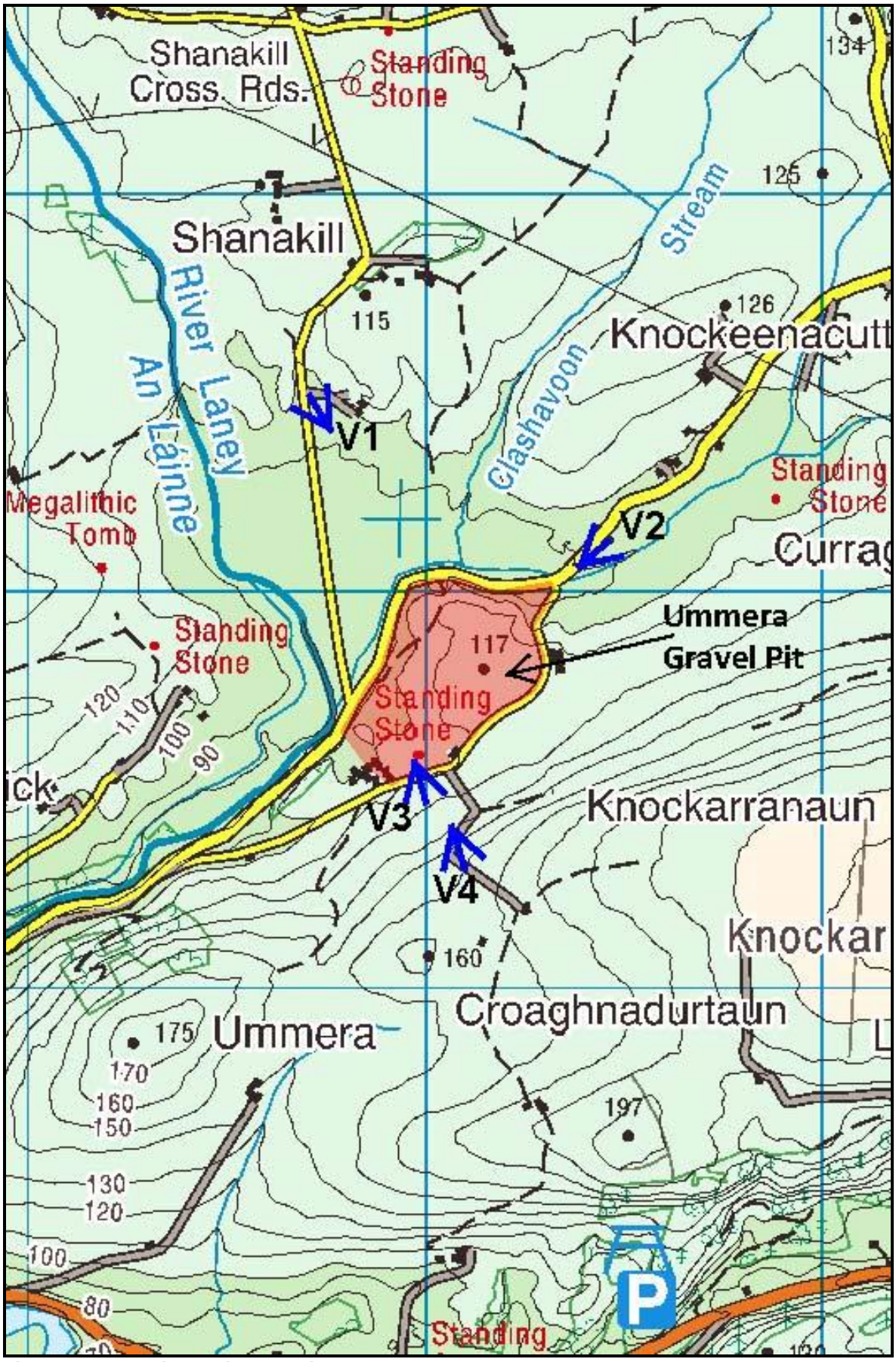

Figure 11-1: View Point Location Map

Figure 11-2: V1iew No.1 – From Local Road L-7478 Looking East

Figure 11-3: View No.2 - From Local Road L-3423-20 Looking South

Figure 11-4: View No.3 - From Local Road L-34231-0 Looking North

Figure 11-5: View No.4 - From Farm Lane Looking North

Figure 11-6: Artist Impression – Gravel Pit at Full Extent

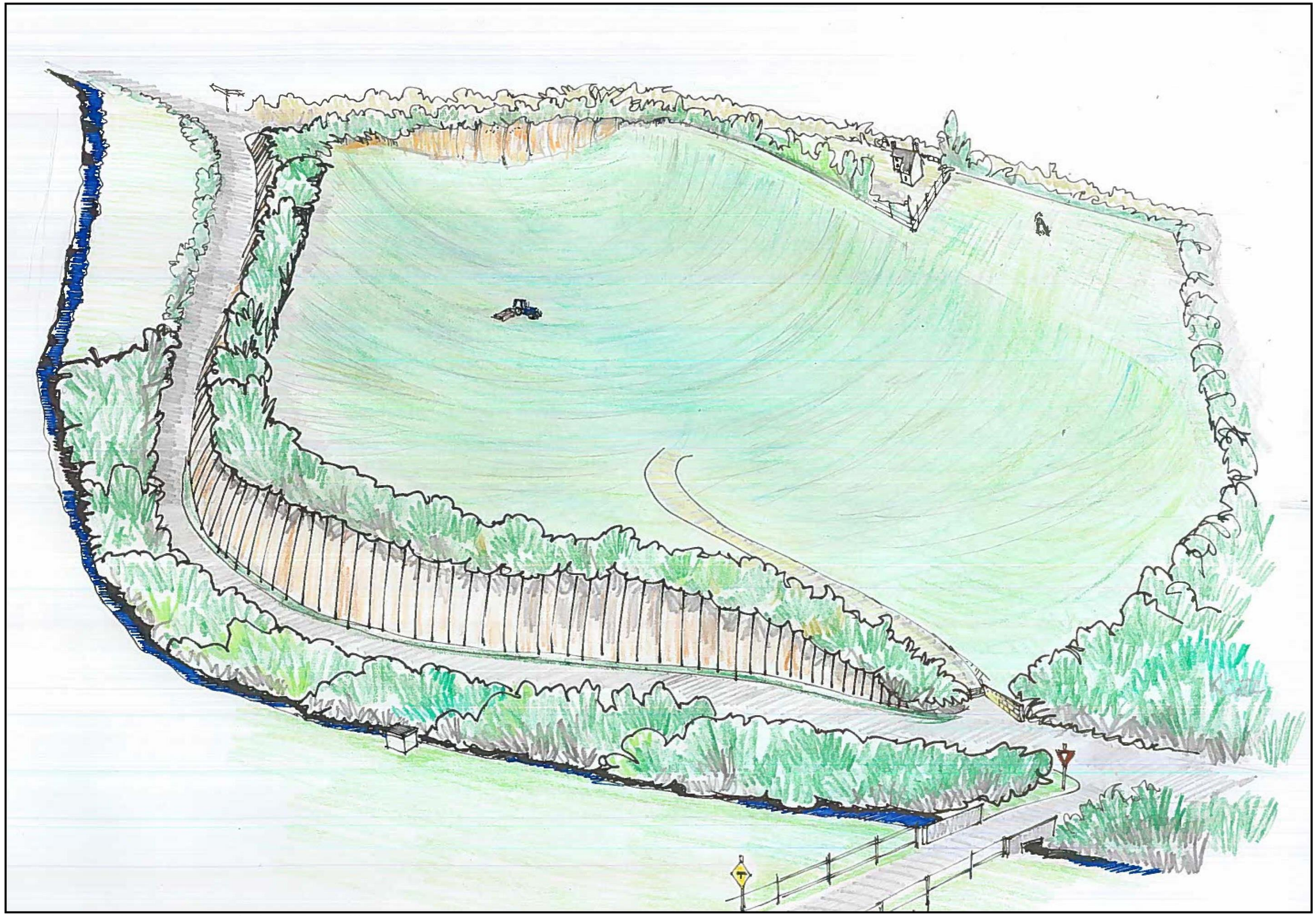

Figure 11-7: Artist Impression – Restored Gravel Pit

12. INTERACTION OF THE FOREGOING

The impacts of the proposed further development of the Ummera gravel pit has been assessed for the various aspects of the environment, as discussed in the preceding chapters. While these assessments are not conducted in isolation, their focus is on the specific aspect of the environment under consideration. This chapter reviews all the aspects of the environment and identifies interactions between them. Table 12-1 summarises the interactions for the operational phase of the gravel pit. Each aspect of the environment is listed on the left column and the top row. The interactions are discussed in terms of the impacts associated with the aspect of the environment listed in the column with the aspects of the environment listed across the row. For example, the impacts of the further gravel pit development associated with noise & vibration are discussed in terms of their interaction, where occurring, with each of the other aspects of the environment. The interaction is therefore not necessarily reciprocal.

Table 12-1: Interaction Matrix

	Roads & Traffic	Noise	Population & Human Health	Air, Climate & Climate Change	Soils, Geology & Hydrogeology	Surface Water & Hydrology	Archaeology & Cultural Heritage	Biodiversity	Landscape & Visual Impact
Roads & Traffic									
Noise									
Population & Human Health									
Air, Climate & Climate Change									
Soils, Geology & Hydrogeology									
Surface Water & Hydrology									
Archaeology & Cultural Heritage									
Biodiversity									
Landscape & Visual Impact									

Legend

- No Significant Interaction
- Positive Interacting Impact
- Negative Interacting Impact
- Neutral Interacting Impact

12.1 Impact Interactions

12.1.1 Roads & Traffic

The traffic associated with the further development will be similar to the current traffic associated with the gravel pit in terms of range in volumes and operational hours. Traffic associated with the gravel pit will increase noise levels slightly and emissions from HGV have a negative impact on air quality, however, the volume of HGV traffic will be unchanged. The HGVs using the local road L-3423 will have a negative impact with the local population sharing this road.

12.1.2 Noise

Noise is one of the aspects of the environment considered in terms of its impact on the local population. The operation of the gravel pit has resulted in an increase in noise locally and although within emission limit values are considered a slight negative impact. As the gravel pit advances to the south, the noise levels will increase in this direction, but will stay within emission limit values. The noise from the extraction activities may also displace wildlife from the local area.

12.1.3 Population & Human Health

Human beings are discussed in terms of settlement pattern, socioeconomics and recreation and amenity. These aspects of the discussion do not have any significant interaction with other aspects of the environment. The increase in local population seen in recent years is likely to continue and may place demand on the gravel pit for house construction, which is seen as a positive impact.

12.1.4 Air, Climate & Climate Change

No significant interaction is predicted between air, climate and climate change with other aspects of the environment during the operation of the gravel pit.

12.1.5 Soils, Geology & Hydrogeology

The availability of aggregate and construction materials produced at the gravel pit has contributed to the construction of new houses to meet the demands of an increasing population and will continue to do so during its further development. Also, with farming being the main economic activity in the area, the availability of construction materials locally for the construction of farm buildings and slatted houses is seen as a benefit.

The development of the gravel pit has resulted in a greater biodiversity at the site. This is seen as a positive impact.

12.1.6 Surface Water & Hydrology

The on-site settlement ponds are seen as adding biodiversity locally, with the potential for attracting wildlife to the area. For example, bats are thought to feed at the settlement ponds.

12.1.7 Archaeology & Cultural Heritage

No significant interaction has been identified between archaeology and cultural heritage with other aspects of the environment during the assessment period.

12.1.8 Biodiversity

No significant interaction has been identified between biodiversity with other aspects of the environment for the further development of the gravel pit.

12.1.9 Landscape

The landscaping of the site has increased the biodiversity of the local area. For example, the planting of trees at the original settlement ponds has provided shelter and foraging opportunities. Also, the exposure of sand in the working faces has attracted nesting Sand martins. These features will be retained during the restoration of the gravel pit to increase the local biodiversity.

12.2 Conclusions on the Interaction of the Foregoing

The interactions of all environmental factors indicate an overall positive development capable of the continued provision of a non-renewable aggregate resource. The main impacts have been discussed in the preceding chapters and appropriate remedial measures are presented where necessary. The further development of the gravel pit can be operated and managed so that impacts on the environment are not significant.

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