Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

August 2022

Glenveagh
Home of the new.

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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CHAPTER 1

Introduction

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1 Introduction

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) sets out the results of the environmental assessments which have been completed for the proposed development to inform the planning consent process.

The assessment has been completed as a statutory environmental assessment. The environmental impact assessment process has been completed in line with Directive 2014/52/EU, based on the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).

Chapter 1 introduces the project and describes the scope and methodology of the EIA process. The consultation process which was undertaken is outlined and the competencies of the environmental assessment team are provided.

1.1.1 Project Description

Glenveagh Homes Ltd, wish to submit an application to An Bord Pleanála under the Planning and Development (Housing) and Residential Tenancies Act 2016 for a strategic housing development at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare comprising of the following:

- The construction of 289 no. residential units comprising of a mixture of 3/4 bed semi-detached units and 1 and 2 bed apartment, duplexes and townhouse;
- A 400.7m^2 creche/childcare facility to accommodate for c.60 childcare places;
- The provision of landscaping and amenity areas, including play/exercise equipment, a linear amenity walkway, informal play areas and local play areas;
- The provision 2 no. pedestrian connections to the existing public footpath along the N85, 2 no. pedestrian connections into Ballymacaula View Estate, improvements/upgrades to the pedestrian footpaths along Circular Road including an uncontrolled pedestrian crossing and pedestrian footpath provision along part of the Drumbiggle and Cahercalla Roads;
- All associated infrastructure and services including 1 no. vehicular access point onto Circular Road, car parking and bin storage, lighting, 2 no. ESB substations, drainage and 1 pumping station, boundary treatments at Ballymacaula, Keelty, Drumbiggle, Circular Road, Ennis, Co. Clare.

A detailed description of the project is provided in Chapter 2 Project Description. The location and context of the site are shown on Figures 1.1 and 1.2 below.

Figure 1.1: Site Location

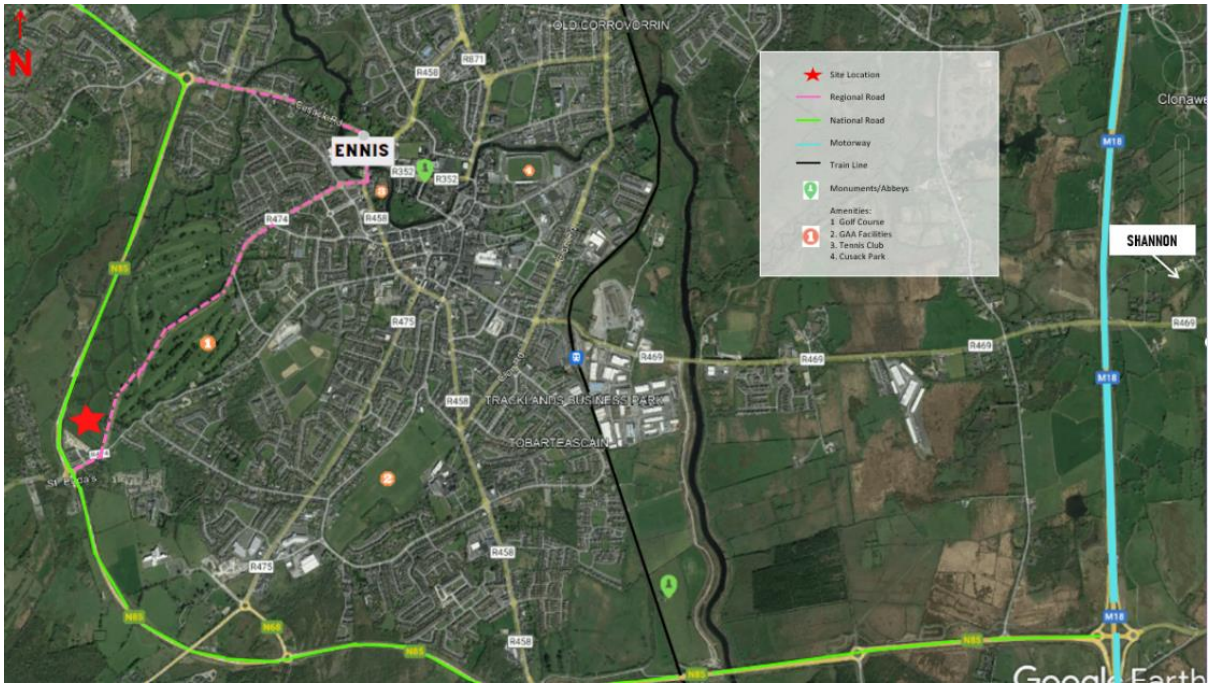

Figure 1.2: Site Context and surrounding infrastructure

1.1.2 The Applicant

Glenveagh Homes Ltd is the applicant and is a leading Irish home builder founded in 2017.

1.1.3 Background and Purpose of the EIAR

As defined in the Environmental Protection Agency - Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, an Environmental Impact Assessment (EIA) is the:

> "*process of examining the anticipated environmental effects of a proposed project – from consideration of environmental aspects at design stage, through consultation and preparation of an Environmental Impact Assessment Report (EIAR), evaluation of the EIAR by a competent authority, the subsequent decision as to whether the project should be permitted to proceed, encompassing public response to that decision*"

This proposed development falls within the class of development types requiring an EIA under Schedule 5 of the Planning and Development Regulation 2001 (as amended). Environmental Impact Assessment (EIA) requirements derive from EU Directives. Council Directive 2014/52/EU and amended Directive 2011/92/EU is transposed into Irish Law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. Schedule 5 (Part 2) of the Planning and Development Regulation 2001 (as amended) sets mandatory thresholds for each project class.

Sub-section 10 addresses 'Infrastructure Projects' and requires that a number of classes of projects be subject to EIA. The following classes are applicable to the proposed development:

10. Infrastructure projects

> *(b)(i) Construction of more than 500 dwelling units.*
>
> *(b)(iv) Urban Development which would involve an area greater than 2 hectares in the case of business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.*
>
> *(In this paragraph, 'business district' means a district within a copy or town in which the predominant land use is retail or commercial use)*

The proposed Strategic Housing Development (SHD) is for 289 units including a creche on a site area of c11.32 hectares. While this does not exceed the threshold of 500 units set out in 10(b)(i), a mandatory EIA is required under the provisions of Part 2, Article 10(b)(iv) as the proposed development site comprises of c11.32 hectares within the built-up area of Ennis, Co. Clare.

1.2 Methodology

This EIAR document has been prepared in accordance with the requirements set out in the Planning and Development Act 2001 (as amended) and in the Council Directive 2011/92/EU as amended by Directive 2014/52/EU (the EIA Directive). The Planning and Development Act and Regulations 2000 to 2018 have been amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) to take account of the requirements of the EIA Directive (Directive 2014/52/EU).

Annex IX of the EIA Directive and Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) (Regulations) 2018 specify the information to be contained in EIAR. These requirements identify a range of prescribed environmental factors, the significant effects of which have been addressed in this EIAR. These include population and human health, biodiversity, land and soil, water, air and climate, noise, landscape, cultural heritage and material assets as well as the inter-relationship between the above topics.

The preparation of this EIAR was also undertaken in accordance with the following guidance;

- Department of Housing, Planning, Community and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Department of Housing, Planning, Community and Local Government (2017) Transportation of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems;
- Department of Housing, Planning, Community and Local Government (2017) Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environments (EIA Directive): Advice on the Administrative Provisions in Advance of Transportation;
- Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

1.2.1 Format and Structure of EIAR

This EIAR has been prepared according to the 'Grouped Format Structure'. This means that each topic is considered as a separate section and is prepared by relevant specialists.

The EIAR is divided into three Volumes as follows:

Volume I: Non-Technical Summary.

Volume II: Main Environmental Impact Assessment Report.

Volume III: Appendices to the Main Environmental Impact Assessment Report.

Volume II is presented in the following Chapters of this report.

McCutcheon Halley Planning Consultants (MH Planning) are the planning consultants and project coordinators of the EIAR. The EIAR structure and consultant responsible for each of the chapters is set out in Table 1.1.

1.3 Design Team and Competency

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, Glenveagh Homes Ltd, engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters, the consultant forms and lead authors are listed in Table 1.1. Information on the competency of the relevant consultant is provided at the start of each chapter.

Table 1.1: List of EIAR Team

Consultant	Chapters
McCutcheon Halley Planning Consultants, 6 Joyce House, Barrack Square, Ballincollig, Co. Cork Tel: (021) 4208710	Chapter 1 Introduction Chapter 2 Project Description Chapter 13 Population and Human Health Chapter 14 Significant Integrations of Impacts Chapter 15 Summary of Mitigation and Monitoring
Deady Gahan Architects, Eastgate Village, Little Island, Co. Cork Tel: (021) 4365006	Chapter 2 Project Description Chapter 3 Alternatives Considered
Doyle O'Troithigh Landscape Architecture Pembroke House 28-32 Upper Pembroke Street Dublin 2 Tel: (01) 6087782	Chapter 4 Landscape and Visual Impact
TOBIN Consulting Engineers	Chapter 2 Project Description Chapter 5 Material Assets: Traffic and Transportation

Consultant	Chapters
Block 10-4 Blanchardstown Corporate Park, Dublin 15 Tel: (01) 8030406	Chapter 6 Material Assets – Service, Utilities and Infrastructure Chapter 7 Soils and Geology Chapter 8 Hydrology and Hydrogeology
Enviroguide Consulting 3D Core C, Block 71, The Plaza Park West, Dublin Tel: (01) 565 4730	Chapter 9 Biodiversity
AWN Consulting The Tecpro Building, Clonshaugh Business & Technology Park, Dublin 17 Tel: (01) 8474220	Chapter 10 Noise and Vibration Chapter 11 Air Quality and Climate Change Chapter 16 Risks of Major Accidents and Disasters
John Cronin and Associates, 3A Westpoint Trade Centre, Ballincollig, Co. Cork Tel: (021) 421 4368	Chapter 12 Cultural Heritage and Archaeology
GNet 3D, NSC Campus, Mahon, Co. Cork Tel (021) 230 7043	Photomontages

1.3.1 EIAR Study Team Qualifications

The qualifications of consultants responsible for each discipline is provided in the introduction to the relevant chapter. Production of the EIAR has been coordinated by Tom Halley, BA of Architecture, Certificate in Civil Engineering, Masters in Regional and Urban Planning, BA in Science and Geography, Director with McCutcheon Halley Planning Consultants and Majella O'Callaghan MSc Urban and Regional Planning, BA (Hons) Geography and Economics, Diploma in Project Management, Senior Planning Consultant with McCutcheon Halley Planning Consultants.

1.3.2 Difficulties Encountered in Compiling Information

No difficulties were encountered in compiling information for this chapter of the EIAR.

1.4 Scoping and Public Consultation

The EIAR was scoped following an appraisal of the 2022 EPA Guidelines of information to be contained within the EIAR, through design team meetings with the specialist consultant and the S247 Pre-Planning Meeting with Clare County Council held on 15th October 2021.

The EIAR was also informed by the Inspector's Report and Opinion received from An Bord Pleanála during the Pre-Application Consultation process (ABP Ref: 312194-21).

Prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR. A dedicated EIA portal number has been assigned to the project and forms part of Appendix 1.2 of this Chapter.

A dedicated website has been created for this project and is available here: https://ennisshd.ie

The following prescribed bodies have been consulted in relation to the general scope of the EIAR;

Prescribed Bodies/Agencies

1) Department of the Environment, Climate and Communications;
2) Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs;

3) Department of Education;
4) Geological Survey Ireland
5) Environmental Protection Authority;
6) Office of Public Works (OPW);
7) Transport Infrastructure Ireland (TII)
8) The National Transport Authority;
9) The Health and Safety Authority;
10) The Health Services Executive (HSE);
11) Inland Fisheries Ireland;
12) Bat Conservation Ireland;
13) Irish Water;
14) An Tasice;
15) Birdwatch Ireland;
16) Failte Ireland;
17) Bord Gais; and
18) ESB.

At the time of submission of the EIAR, 5 responses had been received from the following prescribed bodies. The responses are summarised below and are presented in full in Appendix 1.1;

- Geological Survey Ireland (GSI) on the 15th February 2022;
- Department of the Housing, Local Government and Heritage on the 22nd April 2022;
- Health Service Executive (HSE) on the 11th February 2022;
- Irish Water (IW) on the 8th February 2022; and
- Transport Infrastructure Ireland (TII) on the 17th February 2022.

TII: The TII recommended that the developer should have regard, inter alia, to the following:

- Adequate surface water drainage proposals need to be presented for development proposals in this area which demonstrates that the drainage regime associated with the N85, national road, is safeguarded and independent from the road;
- The EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network to demonstrate that the development can proceed complementary to safeguarding the capacity, safety and operational efficiency of that network;
- Consultation with Local Authority/National Roads Design Office with regard the locations of existing and future national road schemes;
- The Environmental Assessment should have regard to the previous Environmental Assessment Statements/Reports and conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area;
- Where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting construction and operational traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads.
- Assessments and design and construction and maintenance standards and guidance are available at TII Publications that replaces the NRS Design Manual for Roads and Bridges (DMRB) and the NRA Manual of Contract Documents for Road Works (MCDRW).
- Environmental Impact Assessment shall include provision for travel planning/mobility management planning in the interest of protecting national roads capacity in the interest of sustainable travel policy.
- The developer should have regard to TII's Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (NRA, 2006), Environmental Noise Regulations 2006 and how the development will affect future action plans.

IW: Irish Water recommended the following aspects of Water Services should be considered in the scope of an EIA:

- Where the development proposal has the potential to impact an IW drinking water source, the applicant shall provide details of measures to be taken to ensure that there will be no negative impact to Irish Waters drinking water source during the construction and operation phases of the development. Hydrological/hydrogeological pathways between the applicant's site and receiving waters should be identified as part of the report.
- Mitigations for any potential negative impacts on water sources which may be in proximity to be included;
- Impacts of the development on the capacity of water services. Submit a pre connection enquiry to determine the feasibility of connection to the Irish Water network.
- Applicant to identify any upgrading of water services.
- In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks and potential measures to minimise and or/stop surface wates from combines sewers.
- Applicant to determine the location of public water services assets, possible connection points from the applicant's site/lands to the public network and any drinking water abstraction catchments to ensure these are included and fully assessed;
- Hydrological/hydrogeological pathways between the applicants sites and receiving waters should be identified within the report;
- Mitigation measures in relation to any of the above ensuring a zero risk to any Irish Water drinking water sources.

HSE: HSE EIAR Scoping Consultation Report states the following:

- The applicant should assess the impact of the construction works having regard to the waste management, pest control management, emissions to air including noise, emission to surface/groundwater and all sensitive receptors in the vicinity of construction works should be identified. It is also recommended a site specific construction management plan is prepared and included in the EIAR;
- It is recommended that green space and nature based solutions are provided for the storage and conveyance of rainwater on site and to improve flood mitigation in line with the principle of Sustainable Urban Drainage Systems (SUDS);
- Climate consideration should be integrated into the development;
- The development should promote physical activity/ promote walking and cycling and ensure connectivity to the wider Ennis area;
- A traffic and transport assessment should be carried out to assess the existing sustainable facilities and capacity and it is recommended a travel plan;
- The applicant should assess the impact the development will have on existing biodiversity in the area. The impact of any7 possible loss of recreational and amenity green area as a result of the proposed development should be assessed. The applicant shall outline to protect and promote biodiversity on the site;
- A noise assessment must be undertaken to assess the impact of noise from the development on the residents living in the area, noise from traffic movements or heavy goods vehicles associated with the operation of the development should be included in the noise assessment. It is essential that up to date baseline monitoring is undertaken to establish the existing noise environment and the predicted change in the noise environment should be fully assessed.
- Key infrastructure facilities and amenities within the town of Ennis should be examined to ensure the town can sustainability accommodate the proposed increase in residential development. The cumulative impacts of any other proposed housing developments in the vicinity should also be assessed.

GSI: Geological Survey Ireland provided the following response:

- Our records show that there are no County Geological Sites in the vicinity of the proposed housing development.
- Proposed developments need to consider any potential impacts on specific groundwater abstractions and on groundwater resources; for areas underlain by limestone, please refer to karst specific data layers. The groundwater data viewer indicates a 'regionally important aquifer-Karstified (conduit) underlies the proposed housing development. The groundwater vulnerability map indicates a range of groundwater vulnerabilities within the area covered is variable. We would therefore recommend use of the Groundwater Viewer to identify areas pf High to Extreme vulnerability and 'Rock at or near surface' in your assessments, as any groundwater-surface water interactions that might occur would be greatest in these areas.
- We would recommend use of the Aggregate Potential Mapping viewer to identify areas of High to Very High source aggregate potential within the area.
- A copy of any site investigations carried out would be added to GSI if provided.

DoH: Department of Housing provided the following response:

- The development should assess the direct and indirect significant effects of the project on biodiversity, assessment and potential mitigation proposals should be noted that the site is utilised by badgers and other mammals. There are good quality ecological corridors throughout the site in form of stone walls which are suitable for protected mammals.
- Any mitigations measure proposed for protected species need to be assessed against the adverse effects the project or plan is likely to cause (alone or in combination with other projects or plans). To assess mitigation measures, the following tasks must be completed:
    - list each of the measures to be introduced (e.g. habitat compensation, timing of construction works);
    - explain how the measures will avoid the adverse impacts on the species;
    - explain how the measures will reduce the adverse impacts on the species.
    - Then, for each of the listed mitigation measures:
    - provide evidence of how they will be secured and implemented and by whom;
    - provide evidence of the degree of confidence in their likely success;
    - provide a timescale, relative to the project or plan, when they will be implemented.
- Evidence should be provided of how the mitigation measures will be monitored and should mitigation failure be identified, how that failure will be rectified.
- Any losses of biodiversity habitat associated with a proposed development should be mitigated for;
- Under Article 10 of the Habitats Directive, member states must maintain and where possible enhance landscape features to improve the coherence of the Natura 2000 network. To ensure there is no net loss of native hedgerow/stone walls due to the development, if removal is necessary, it should be ensured that the same or greater length of compensatory native hedgerow will be planted. A plan to retain, transplant or provide compensatory planting to ensure there is no net loss of such features should be provided with the development proposal.
- A constraints led approach should have been adopted in planning and designed the layout and scale of development and in devising mitigation measures, including mitigation by avoidance. In terms of retention and avoidance protection by appropriate setback distances, landscaping and boundary treatments should be considered.
- The site is approximately 1km from the Lower River Shannon SAC 2165 and it is also less than 2km from the Newhall and Edenvale Complex SAC 002091. The key concerns in relation to likely significant effects of the proposed project alone or in combination with other plans and projects on these European sites for example, in view of their conservation objectives, include the following:
    - The Conservation Objectives of the latter Lesser Horseshoe Bat SAC site for Extent of potential foraging habitat includes No significant decline within 2.5km of qualifying roosts and for Linear

features includes No significant loss within 2.5km of qualifying roosts as linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost. In terms of its Potential Foraging Grounds potential the proposed development site is mapped within the potential foraging range (for all three roosts within the SAC) in said Conservation Objectives (NPWS (2018) Conservation Objectives: Newhall and Edenvale Complex SAC 002091. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht). The proposed site contains such linear features and potential loss of foraging habitat will need to be assessed.

1.5 Cumulative Impacts

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. The projects in Table 1.2 were identified as being proposed or permitted in proximity to the proposed SHD, and have been assessed by each discipline for potential cumulative impacts. Within the EIAR, other disciplines may identify further projects which are considered to be relevant in their assessments.

Table 1.2: Projects considered for cumulative impacts

Proposal/Application	Planning Reference/An Bord Pleanála Reference	Comment
Permission for the proposed building upgrade works to, DSP Intro Office, Block 1, Government Buildings, Kilrush Road, Ennis, Co. Clare. Works include: A) Replacement roof finish and rooflight: B) New PV panels to roof and rooflight b) New PV Panels to roof C) New external wall insulation and render D) Elevation changes to include new doors and entrance lobby screens E) New Service Yard to the south-west of the building F) Changes to the site layout to include EV charge points All associated site works	Clare County Council Ref: 22/139	Permission granted by Clare County Council dated 13th April 2022.
Permission for the construction of 58 no. residential units at Drumbiggle, Ennis, Co. Clare. Alterations and upgrade to the access road and associated site development works. The application is accompanied by a Natura Impact Statement (NIS)	Clare County Council Ref: 21/599 and ABP Ref: 313217-22	Under Appeal with An Bord Pleanála, decision due 08th August 2022
Permission for a change of use from retail warehouse to discount foodstore, extension to the rear and north of the existing building resulting in a total gross floor area of 2,270m^2	Clare County Council 21/756 and ABP Ref: 311569-21	Under Appeal with An Bord Pleanála, decision due 16th February 2022 (decision deferred by An Bord Pleanála)
Permission for demolition of existing farm shed, refurbishment and conversion of existing farmyard building into 10 no. housing units, refurbishment and conversion of the existing coach house into 1 no. housing unit and construct 4 no. terraced dwelling houses within the curtilage of the Protected structure of Cahercalla House.	Clare County Council Ref: 18/8009	Permitted by Clare County Council on the 17th August 2018
Permission for the construction of 39 no. 2 storey dwelling houses and 3 no. single storey dwelling houses, the provision of a foul pumping station and associated raising main to existing foul sewer, retire existing 38Kv overhead lines and associated poles within the proposed development and erect 2 number triple pole 38Kv cable end poles.	Clare County Council Ref: 17/237, ABP Ref: 300590-18	Permitted by An Bord Pleanála on the 29th May 2018

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CHAPTER 2

Project Description

August 2022

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2 Project Description

2.1 Introduction

The EIA Directive requires that an EIAR includes a description of the project comprising information on the site, design, size and other relevant features of the project. Recital 22 of the 2014 Directive requires that "*In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases".*

This chapter satisfies the requirements of the EIA Directive, providing detail on the location, size and characteristics of the proposed project.

2.1.1 Author Information and Competency

This chapter of the EIAR has been prepared by Deady Gahan Architects, in conjunction with McCutcheon Halley Planning Consultants. More specifically, this chapter of the EIAR was prepared by Eamonn Gahan, director of Deady Gahan Architects, BA (Hons) Architecture, Post Graduate Diploma in Architecture, MRIAI, and Majella O'Callaghan BA (Hons) Geography and Economics, MSc Urban and Regional Planning and Diploma of Project Management.

Eamonn Gahan, director of Deady Gahan Architects, studied architecture in the United Kingdom and worked for a number of years in London before returning to Ireland. He has over 20 years professional experience in designing residential, healthcare and commercial projects. Eamonn is a registered RIAI Architect, is an RIAI Grade 3 Conservation Architect and a qualified Passive House Designer (Architects Registration No. 04148).

Majella holds qualifications in Planning and Project Management and is a corporate Member of the Irish Planning Institution. She has worked with muti-disciplinary teams on a number of projects and has over 10 years planning experience and has provided input to a variety of development projects that require environmental and planning assessment of potential impacts.

2.1.2 Reference to Guidelines Relevant to Discipline

As outlined in Section 2.1, this chapter will set out a detailed description of the project together with details of the existing environment in accordance with Article 5(1)(a) of the 2011 Directive, as amended by Directive 2014/52/EU, the description of the proposal should comprise "…*information on the site, design, size and other relevant features of the project*".

The National, Regional and Local Guidelines relevant to the development of the built environment in Ireland are referenced by the architect. These include the following documents:

- National Planning Framework 2040
- Urban Development and Building Height Guidelines for Planning Authorities
- Sustainable Urban Housing: Design Standards for New Apartments: Guidelines for Planning Authorities
- Clare County Council Development Plan 2017-2023
- Design Manual for Urban Roads and Streets (DMURS)

2.1.3 Methodology

Please find below the methodology followed in developing the proposed layout and the main information taken into consideration:

- The site conditions, constraints and history
- The planning history of the area

- The relevant guidelines
- The topographical survey with the existing contours and landscape features
- The aim to create an informed and high quality environment and to answer to the social and market request of houses.
- Collaboration with all of the design team members and all relevant departments of the Local Authority.

2.1.4 Difficulties Encountered in Compiling Information

The site has presented some challenges and issues to be resolved along the design process and they have mainly been caused by:

- The long and complex planning history: Deady Gahan Architects were not involved in the previous design which was granted planning and extensive research needed to be conducted to ensure a complete knowledge of the planning history of the area;
- Dealing with noise mitigation along the N85 national road; and
- The difficult topography of the land.

2.2 Description of Existing Environment

2.2.1 Site Location

The subject site of 11.32 Ha is located west of Ennis town centre and occupies a green field site beside the N85 National Road. In the immediate context of the site is Ennis Golf Club to the east and a recently completed development to the south west of the subject site. The site is located near a variety of facilities in Ennis town within a 20-minute walking distance.

The site is bounded on the western side by the N85 national road and a series of bungalows are situated to the east, with the land to the north designated as zoned open space.

The site is within easy walking distance of a number of commercial, recreational and community facilities including local shops, churches and schools. Access to the site is via Circular Road which runs along the east of the site.

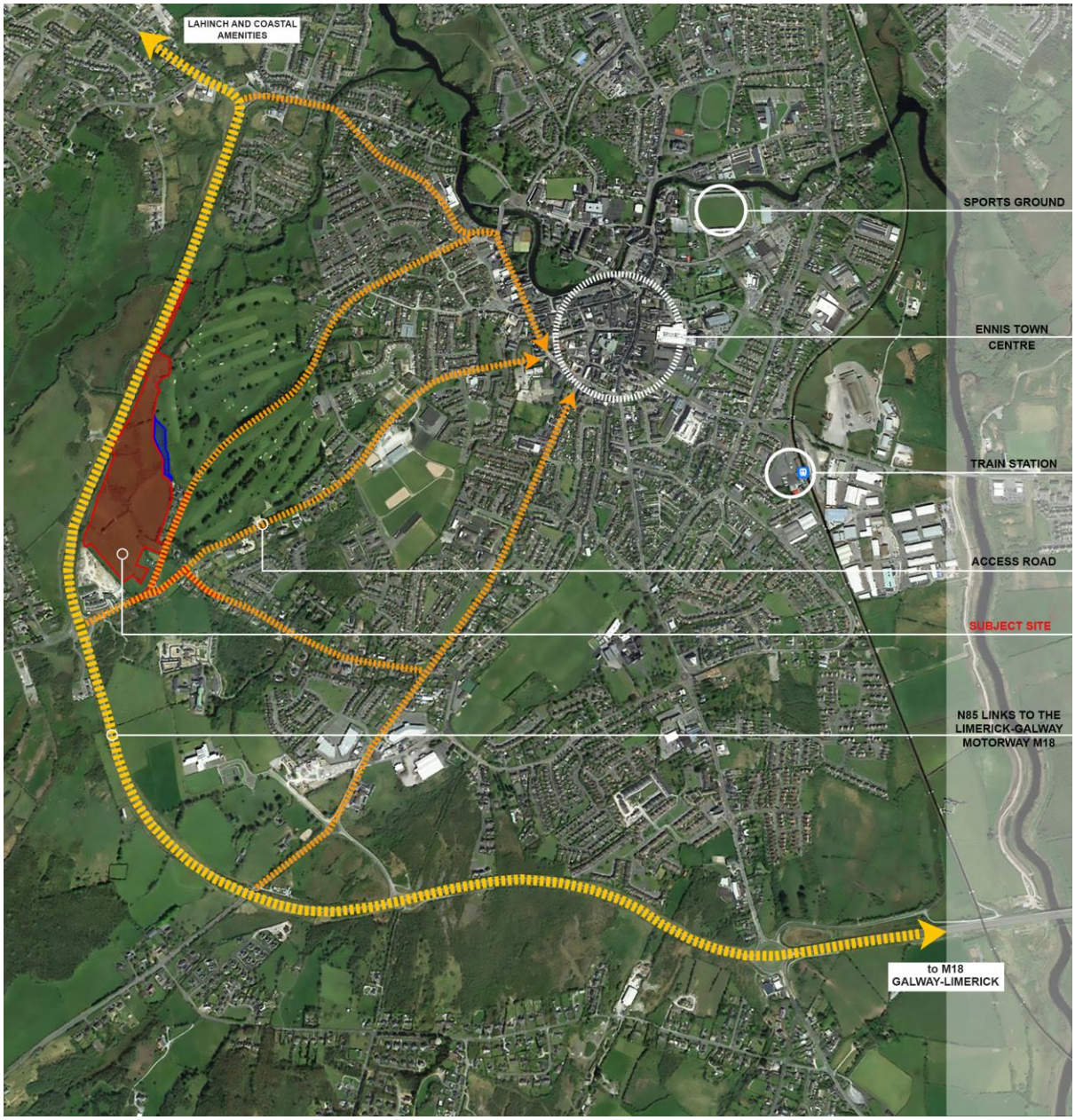

Figure 2.1: Google Maps – Site Location

2.2.2 Site Context

The proposed development is located in the townlands of Ballymacaula and Drumbiggle within the town of Ennis. The subject site is situated to the west of Ennis town centre and approximately 25 kilometers north of Shannon Airport. The site lies within close proximity to several important routes including the N85 Ennis ring road, the M18 Limerick-Galway route and the R474 Ennis to Miltown Malbay route. The total site area comprises 11.32 hectares and slopes downwards in a northerly direction. There is a net developable area of 8.9 hectares. The Claureen River is located to the north which flows adjacent to the north boundary of the site.

The site itself is made up of a group of greenfields subdivided by a variety of hedgerows. These native hedgerows define the existing field boundaries and are part of the local green infrastructure network. There are several mature tree species contained within the hedgerows with prominent high value trees retained within the open spaces. These are dealt with further in the Landscape and Visual Impact Chapter (Chapter 4) and the Biodiversity Chapter (Chapter 9).

The proposed layout will take the place of a previously granted scheme taking up a section of the site. The previous scheme consisting of 98 units had been granted on part of the site (under An Bord Pleanála Ref. No. 306088-19), and consisted of a large quantity of apartments and duplex units.

2.3 Description of Proposed Development

2.3.1 Residential Development

Figure 2.2: Site Plan

The design of the proposed scheme has been informed by detailed pre-planning discussions and a Tripartite meeting with Clare County Council's Planning, Engineering and Environmental Departments and An Bord Pleanála, in order to gain vital input prior to the formal submission of the proposed development. This input, as well as the relevant planning policy documents at national and local levels, including in particular the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns & Villages), the Urban Design Manual – A Best Practice Guide and the Design Manual for Urban Roads and Streets at a national level, and the 2017-2023 Clare County Development Plan aided in developing the final site layout. The proposed development will function as a natural extension to the town of Ennis. The proposed scheme is located on a key site to promote connections along the N85.

The proposed layout includes 289 no. residential units comprising:

- No. 074 – 3/4-bed semi-detached units (no.34 standard semi-detached units and no.40 shallow units)
- No. 125 – 3-bed townhouse units
- No. 066 – 2-bed townhouse units
- No. 012 – 2-bed ground floor apartment and duplex units with own door access
- No. 012 – 1-bed apartment and simplex units with own door access

The housing mix will focus on providing affordable homes for both individuals and families alike.

The proposed scheme has a density of 32.5 units/HA considered on a net developable area of 8.9 HA which is appropriate for residential zoned land in close proximity to Ennis town centre. For this calculation the buffer strip along the N85 boundary and the zoned open space to the north of the site have been excluded from the site area of 11.32 HA. The proposed density is in line with recommendations in the following national policy documents:

- National Planning Framework 2040;
- Urban Development and Building Height Guidelines for Planning Authorities; and
- Sustainable Urban Housing: Design Standards for New Apartments: Guidelines for Planning Authorities

There is also a provision for a childcare facility in the form of a 60-child crèche on site. It has been placed adjacent to the site entrance to allow for convenient accessibility and to address the Circular Road by creating an entrance feature.

2.3.2 Proposed Strategic Housing Development

The proposed development is for the construction of a strategic housing development located at Ballymacaula, Drumbiggle, Circular Road, Ennis, Co. Clare. The design rational is to create and deliver a high quality, sustainable, strategic housing development which respects its setting and maximizes the sites natural attributes. The proposed site layout is illustrated in Figure 2.2 and the development comprises of the following:

1. The construction of 289 no. residential units comprising a mixture of 12 no. 1 bed apartments, 78 no. 2 bed townhouse/duplex units, 165 no. 3 bed dwelling houses, and 34 no. dwelling houses which will have an option of a 3 or 4 bedroom house-type;
2. A 400.7m^2 creche/childcare facility;
3. The provision of landscaping, open space and amenity areas, including play/exercise equipment, a linear amenity walkway, informal play areas and local play areas;
4. The provision 2 no. pedestrian connections to the existing public footpath along the N85, 2 no. pedestrian connections into Ballymacaula View Estate, improvements/upgrades to the pedestrian footpaths along Circular Road including an uncontrolled pedestrian crossing and pedestrian footpath provision along part of the Drumbiggle and Cahercalla Roads;

5. All associated infrastructure and services including 1 no. vehicular access point onto Circular Road, car parking and bin storage, lighting, 2 no. ESB substations, drainage and 1 pumping station, boundary treatments at Ballymacaula, Drumbiggle, Circular Road, Ennis, Co. Clare.

A Natura Impact Statement and Environmental Impact Assessment Report has also been prepared in respect of the proposed development.

2.3.3 Connectivity and Access

Connectivity is one of the central design principles of the proposed scheme. The current layout is therefore crossed by several connections and links which connect to the adjacent areas. Logical movement routes through the new hierarchy of streets and paths assists vital future connections and the integration of the scheme into its context. The positive impact of the improved connectivity provides local residents with new links to take advantage of an existing transport infrastructure.

The proposed development will benefit from an entrance street (Primary Local Street) providing vehicular south-north access into the development. A prominent main gateway for vehicles, bicycles and pedestrians is formed at this entrance. The development will also be well connected to the recently constructed scheme to the south through 2 no. pedestrian access points. The development proposes to introduce a hierarchy of internal streets with the primary local streets creating loop systems around the site in the north and south, from which more modest streets branch off into a network of secondary local streets and shared surfaces. The design considered the Design Manual for Urban Roads and Streets (DMURS) as an important guide to create interesting diversified streets with a more intimate character, with the addition of shared surfaces which make them safer and more valuable civic spaces usable for communal activities.

The buffer zone required to mitigate noise from the N85 formed guidance to the layout along the western boundary. This led to the provision of an amenity path within this section of the site runs throughout the development connecting the entire site. The 3 to 4.3m wide pedestrian and cycle link follows the Primary Local Street from the entrance through the site, and runs along the central open space joining the amenity path on the western boundary. From here, this path connects to a series of pedestrian paths throughout the site. This amenity walk, along with a generous planted buffer strip acts as a noise buffer between the proposed development and the N85 located to the west. This, along with the orientation of the west facing dwellings, will create a physical barrier that will partially mitigate the noise generated by the N85, ensuring that the proposed development is protected and there are no negative effects. This is further considered in Chapter 10 – Noise and Vibration of the EIAR.

In the local context, the provision for connections from the proposed development to the N85, the southern development and existing amenities within the locality will foster a sense of identity and community for the area.

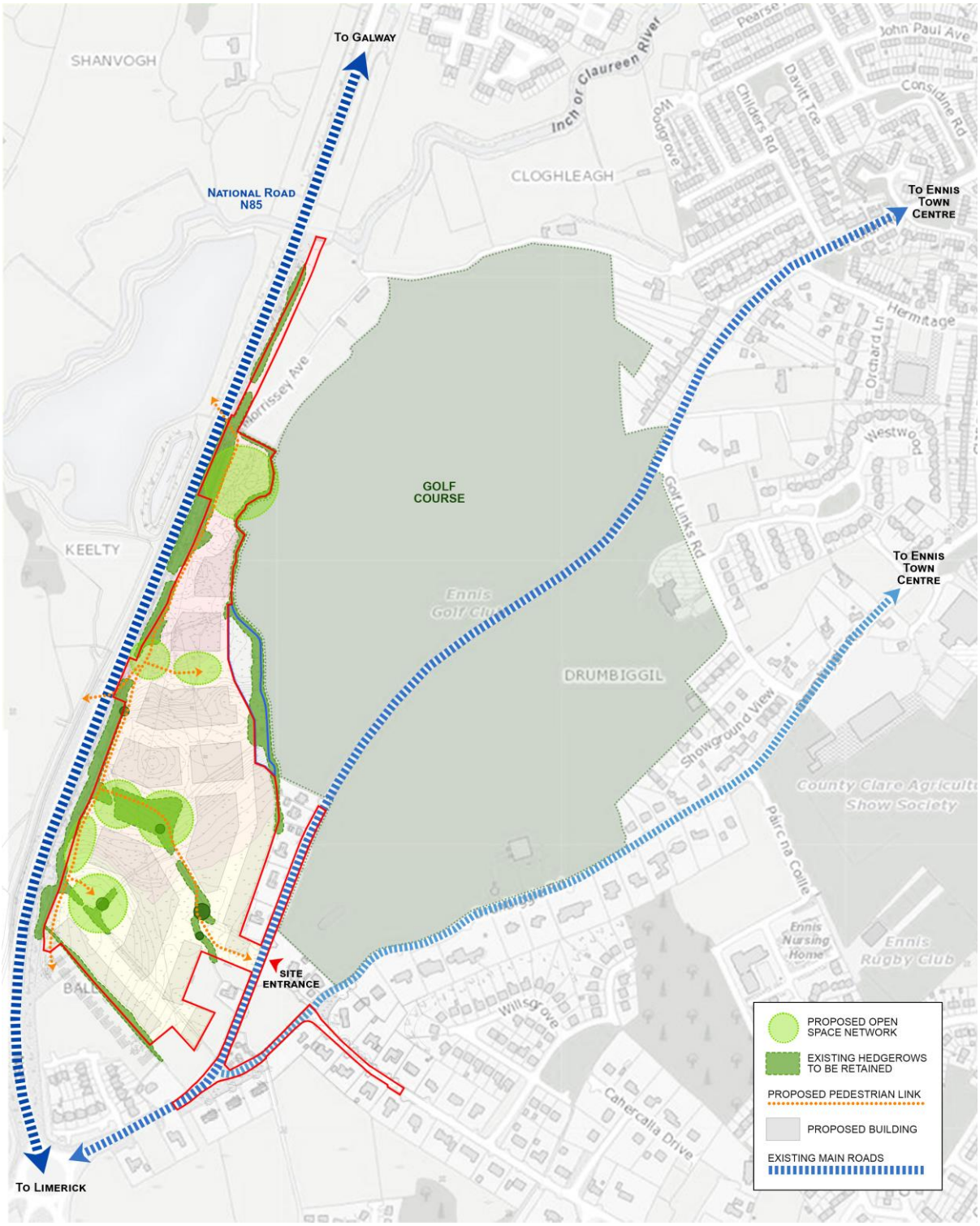

Figure 2.3: Landdirect – Access to Ennis town centre

2.3.3.1 Parking and Mobility

The proposed development places an emphasis on walking and cycling as a more appropriate mode of transport. Where appropriate, shared pathways have been introduced to ensure that every area of the development is accessible on bike. The proposed pedestrian/cycle paths connecting the Site entrance to the N85 will ensure safe access for pedestrian/cyclists onto the wider public road network. The proposed development also includes various pedestrian connection points to areas surrounding the scheme to ensure a well-connected network, providing access to the wider area.

Car parking spaces are provided as per the Development Plan requirements;

- No. 2 car park spaces for the standard 3/4 bed semi-detached units
- No. 2 car park spaces for the 3-bed townhouse and 3-bed shallow units
- No. 1 car park spaces for the 2-bed townhouse, for the duplexes, simplexes and the GF apartments

There is also the provision of visitor car parking spaces, electric charging facilities, disabled car parking spaces, motorcycle parking spaces and bicycle parking facilities within the development.

Table 2.1: Parking Spaces for the Housing units

Unit Types	No. of Units	Parking x Units	Total parking
Standard Semi-detached 3/4 bed	No. 34	No. 2 parking x unit	No. 68
3-bed shallow units	No. 40	No. 2 parking x unit	No. 80
3-bed townhouse units	No. 125	No. 2 parking x unit	No. 250
2-bed townhouse units	No. 66	No. 1 parking x unit	No. 66
Duplex-Apartments Units	No. 24	No. 1 parking x unit	No. 24
TOTAL NUMBER OF PRIVATE PARKING SPACES			**No. 488**
Visitors parking			No. 16
Electric Vehicle parking			No. 08 (of which are allocated as private communal parking)
Disabled Car parking			No. 04
TOTAL NUMBER OF PARKING SPACES			**No. 508**

The total number of parking and bicycle parking provided for the creche area as follows:

Table 2.2: Parking Spaces for the Childcare Facility

Unit Types	Users	Parking Allocation	Total parking
Crèche (60-child)	Staff	No.1 parking space per 3no. staff	No. 5
	Visitors	No. 1 parking per 10no. children	No. 6 (no. 1 disable car space)
TOTAL NUMBER OF CAR PARKING SPACES			**NO. 11** **(+ drop off area)**

Furthermore there are no. 2 motorcycle parking spaces located in crèche car park and 10 no. bicycle parking spaces allocated for the crèche which are located near the crèche and the site entrance of the development.

Regarding the bicycle parking facilities for the units, as asserted in the "Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for planning Authorities", they have been assigned as follow:

- 22 x 4no. covered spaces – residential (refer to bike parking plan as part of this application)
- 7 x 6 no. covered spaces - residential (refer to bike parking plan as part of this application)
- 10 no. spaces (cover) for the childcare facility

- Total no. of spaces – 140 no. bike spaces

For the ground floor apartments, maisonettes, mid terraced units and end townhouse, all the bike spaces are placed in secured bike storage near the relative units. Units with access to a private garden can utilise this for bike storage.

2.3.4 Development Principals

In line with the existing site topography the project raises from north to south by approximately 25 meters. The proposed buildings are arranged in line with the existing contours to minimise the visual impact on the surrounding environment and to reduce the cut and fill and the movement of ground on site. This is discussed more in Chapter 7 – Soils and Geology of the EIAR.

To ensure the visual integration of the site, the proposed development will promote, where possible, the protection and enhancement of natural features on site, including hedgerows and tree lines. The subject site contains a number of such features both within the site and along the site boundaries. These features are integrated within the proposed development to emboss the identity of the proposed 3 no. Character Areas.

Particular attention was placed in the design of the public open spaces to create a strong and well-connected network of usable and enjoyable green areas, cycle and pedestrian paths, plazas and shared surfaces. These features will enhance/contribute to a sense of place.

The hedgerows within the site have been incorporated into the open spaces to create visual and physical connections between the dwellings and open spaces on site and the proposed amenity walk along the western boundary. A series of pedestrian connections are located along the southern, northern and western boundaries to create a permeable site allowing routes through the development.

The larger open spaces are located in the centre and southern sections of the site and act as node points to navigate through the development. These open spaces are carefully positioned in order to take full advantages of the existing topography and provide generous and usable spaces.

These open spaces will be enhanced by the creation of active and architecturally appropriate urban frontages, designed having particular regard to the site context and difference in levels across the site. The proposed dwellings are also orientated to overlook the open spaces, provide opportunities for passive surveillance of these areas and create strong edges within the scheme. To add variety, the larger 2.5 and 3 storey units are located around these areas creating a varied backdrop to the open spaces.

The open spaces vary with a mix of soft and hard landscaping to further enhance the quality of life in the area. Distinct corner units with individual features address the main corners of streets and along the open spaces to provide distinctiveness to the site. The variety and quality of the proposed open spaces support active neighbourhoods within the site as well as promoting connections and integration with adjacent residential developments.

The development is structured to enable the creation of neighbourhoods featuring distinct architectural languages. Each of these character areas are grouped around a central space creating a

recognisable sense of place by using a mix of landmark housing typologies and blend of materials unique to that location.

2.3.5 Houses and Apartments

2.3.5.1 Houses

Figure 2.4: Houses

The houses are designed as two and two and a half storey dwellings, in semi-detached and terrace configurations. The site layout provides a good separation between units to ensure privacy and minimise overlooking. The end-terrace units have been used to turn corners, with front doors and windows to give activity and passive surveillance to the sides and to avoid large blank gables.

The mix of the house types in one row and in the different character areas creates visual interest and contributes to the specific character of the development. Also, the variety of house types provides for a wide choice to suite all potential occupiers, as well as permitting an efficient site layout.

2.3.5.2 Duplex/Simplex-Apartment Units

Figure 2.5: Duplex/Simplex-Apartments

The Duplex/Simplex-Apartment units are spread around the site in prominent locations, especially near the open spaces, to give distinctiveness to the layout.

They are own-door access ground floor apartments and duplex/simplex units that are accessible directly from the footpath and these are built up to create 2/3-storeys buildings. The ground floor apartments and simplex units have a designated garden as private amenity space, while the duplexes above have balconies.

2.3.6 Childcare Facility

The proposed development makes provision for a crèche of 400.7sq.m which will facilitate 60 no. childcare places. This facility is located at the entrance of the site, adjacent the site entrance which will allow for convenient accessibility. The proposal includes parking for both staff and visitors (10 no. car park spaces with 1 no. disable space and 2 no. motorbike spaces) as well as a drop off area.

Figure 2.6: Childcare Facility

2.4 Description of the Proposed Works

2.4.1 Overview of Construction Site Establishment

The site establishment works will be carried out by the appointed Contractor, will include erecting perimeter hoardings around the site, construction of the site compound and storage areas, forming site access and egress points, enacting the traffic management plan, and providing site security.

The extent of compound and storage space required by the Main Contractor will vary for the duration of the works.

For the enabling works and earthworks phases, the Main Contractor will likely require a large-scale compound for storage and segregation of hazardous and non-hazardous excavated material. For the main construction works, the Main Contractor will again require a large compound and material storage area.

Given the size and open nature of the site, it is envisaged that there is adequate space on the site for the site compound, and adequate space to store such materials on a temporary basis, with no provisions for off-site storage proposed currently.

The Main Contractor will be responsible for the security of the site for the duration of the works. All reasonable precautions will be taken to prevent unauthorised access to the site, the works and adjoining properties. Adequate safeguards will be put in place to protect the site, the works, products /materials, plant and any existing buildings affected by the construction works from damage, theft and trespass.

2.4.2 Working Hours

It is proposed that construction works will be carried out between the hours of 08:00 and 18:00 from Monday to Friday and 08:00 and 14:00 on Saturdays. No construction works will be carried out on Sundays or Bank Holidays, without the specific agreement of Clare County Council and workings hours will be confirmed by Clare County Council.

The construction shift times will ensure construction traffic will have limited impact on the peak periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening. A Construction Traffic Management Plan (CTMP) will be developed by the Contractor and presented to Clare County Council for approval prior to commencement of the construction works. The CTMP will contain detailed temporary traffic management drawings for each construction stage and will include the mitigation measures described in this section.

2.4.3 Demolition

Prior to the commencement of any demolition, excavation or construction works at the site a full audit of waste that will be generated on site will be carried out.

Demolition works pertaining to this development will consist of demolition of an existing stone wall, which separates plots of land around the southern area of the site. If possible, materials from the wall will be re-used. Careful extraction of materials will be undertaken to ensure that the highest proportion of the materials can be re-used. If materials are not suitable for reuse, they will be removed from the site and transported to a licensed waste facility.

2.4.4 Earthworks

A site investigation (SI) determined that the site stratigraphy was consistent throughout the site and generally comprised of; topsoil to a depth of 0.3m below ground level (bgl), cohesive deposits, weathered bedrock, and bedrock to a depth of 1.06m-2.6m bgl.

Based on the SI (which forms part of Appendix 6.1 of this EIAR), it is advised that excavation of cohesive deposits will only remain stable for a limited time and will need to be battered if excavation is below 1.25m. Any excavations in soft cohesive deposits and granular deposits will need to be battered or the sides supported at all times.

The development has been designed to minimize and maintain a balance of cut and fill throughout the site, in keeping the proposed finish floor levels of the units and the proposed road levels as close to the existing ground levels as possible, thus, reducing the need to import or export bulk filling during the construction stage.

Uncontaminated excavated soil/subsoil will be used on site for fill requirements, to reduce waste volumes. If there is any excess uncontaminated excavated soil remaining, following the completion of fill, this soil will be taken off site for reuse at another location. The contractor shall ensure the haulage contractor and the receiving site has the necessary Waste Collection Permit from the local authority.

If the soil to be excavated contains contaminants it may still have suitable engineering properties that could make it useful as a fill material. A detailed analysis shall be undertaken to consider the potential options for reuse of the soil. Should this highlight potential options and subject to any legal requirements such as environmental licensing, the contaminated soil will be treated and retained on site for re-use where possible.

Refer to the Construction Environmental Management plan (CEMP) and the Construction Waste Management Plan (CWMP) prepared by TOBIN Engineers for further details on earthworks and details of the management of exported soils from site which have been submitted as part of this application.

2.4.5 Construction Sequencing and Phasing

Construction of the residential development will take place over 3 phases and it is estimated to take 36 months to complete.

Phase 1 of construction will take place in the southernmost and the northernmost areas of the site and will consist of the construction of 110 residential units, the creche, and the roads, pumping station, watermain and drainage facilities associated with these areas. Phase 1 is estimated to be completed within 15 months.

Phase 2 of construction will take place in the central area of the site and will consist of the construction of 133 residential units, and the roads, watermain and drainage facilities associated with these areas. Phase 2 is estimated to be completed within 15 months.

Phase 3 of construction will take place in the northern area of the site and will consist of the construction of 46 residential units, and the roads, watermain and drainage facilities associated with these areas. Phase 3 is estimated to be completed within 6 months.

The construction of social and community uses, public open space and private open space will be staggered throughout each phase.

2.4.6 Traffic Management

The impact of the construction generated traffic on the local road network during the construction of the proposed development is assessed in Chapter 5 Traffic and Transportation, and mitigation measures are proposed where necessary.

Construction traffic travelling to the proposed development site will use the N85 Road and R474 Circular Road. The increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction of the development which will be developed in 3 phases. The designated access point is off the R474, which will allow delivery vehicles to pull off the road and into the site, thus, disruption will be extremely limited.

It is estimated that there will be up to 60 workers active on site per day. Assuming that these workers travel to site individually by private car, it is estimated that they will collectively generate 120 vehicle movements per day. There is estimated to be a maximum of 12 no. HGV vehicle movements per day which will be transporting construction materials and cut and fill material to and from the site. Thus, overall vehicle movements are estimated to be up to 132 per day. Total Excavation and Infill volumes are estimated to be up to 20,000m^3 respectively.

To minimize disruption a Traffic Management Plan (which will be completed by the Contractor appointed to the project) for the construction stage will identify haulage routes and restrictions as appropriate in discussion with the Local Authority. Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development. Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads.

The volume of traffic expected to be generated from the proposed development, and the impact that this may have on roads and junctions is assessed in the traffic and transport assessment report submitted as part of this application. The results indicate that there will not be a significant impact on traffic on the surrounding road network and that all junctions in the surrounding area will operate well within capacity as a result of the development.

The design of shared surfaces within the development creates an environment that allows pedestrians and cyclists and vehicles to be integrated within one space. Pedestrian linkage is provided in all areas throughout the development, with 2m wide footpaths extending along all roads within the development. Furthermore, cyclist linkage is provided along the shared pedestrian/cycle path which

traverses the site from the entrance at the circular road to the east of the site, to the west where it is connected to another shared pedestrian/cycle path which runs parallel to the N85. All roads are wide enough to provide shared carriageway for cyclists and vehicles.

The contractor will be required to promote travel by sustainable modes of transport and to introduce a mobility management plan for its workforce to encourage access to the site by means other than by private car. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with CCC prior to works beginning on site, and will include promotion of the following measures as;

- Walking: The pedestrian environment surrounding the site is considered to be good with footpaths provided along all roads.
- Cycling: Cycle parking spaces and associated showers and lockers will be provided on the site for construction staff.
- Car Sharing: Car sharing among construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance with staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the site car parking facility and will minimize the potential traffic impact on the surrounding road network.
- Public Transport: The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the various public transport services in the vicinity of the construction site, including bus routes that operate in the vicinity of the site.

2.4.7 Construction Phase

At this stage in the project design, it is assumed that that the building will be constructed as an in-situ reinforced concrete frame/timber frame, however, pre-cast elements may also be used, depending on detailed design development. The proposed development is anticipated to be constructed in four sequential phases, three main construction phases preceded and Mobilisation and Enabling Works Phase. The construction sequencing for each phase of the development is described in chronological order as follows:

Enabling Works Phase:

- Phase A: Site Establishment
- Phase B: Demolition and Site Clearance
- Phase C: Utility Diversions

Construction Phases 1-3: Residential units, car parking, roads, footpaths, public open space and communal open space are to be constructed in the following sequence:

- Phase 1: 110 residential units, the creche, roads, pedestrian connections, watermain and drainage facilities associated with these areas.
- Phase 2: 133 residential units, and the roads, watermain and drainage facilities associated with these areas.
- Phase 3: 46 residential units, roads, pedestrian connections, watermain and drainage facilities associated with these areas.

Each Construction Phase will contain the following sub-phases:

- Phase A: Earthworks, Foundation and Podium Structure Works
- Phase B: Superstructure Works
- Phase C: Façade & Fit-Out Works
- Phase D: Landscaping Works

2.4.8 Construction Management Plan

A Construction and Environmental Management Plan (CEMP) has been prepared and submitted as part of the Planning Application. This document presents information on construction logistics, health and safety, construction traffic management, environmental objectives and targets, environmental management, and waste management.

The plan details the requirements and logistics for work involved in the project and seeks to demonstrate how such works can be delivered in a logical, sensible and safe sequence, with the incorporation of specific measures to mitigate the potential impact on people, property and the environment. The CEMP should be viewed as an outline plan with the Construction Management Plan to be developed by the Main Contractor in consultation with Statutory Undertakers / Authorities and affected Stakeholders prior to works commencing on site.

2.4.8.1 Construction Health and Safety

The main contractor is required to provide a best practice working environment for all employees involved in the construction of the proposed development. This includes a responsibility to take into account all relevant statutory laws and guidelines.

All construction activity will be carried out in accordance with the requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013. The main contractor will be required to prepare a Construction Health & Safety Plan prior to commencement of construction activities.

The primary aim of planning for safety on this site is ensuring the safety of people involved in and affected by the development. This includes pedestrians, road users, neighbours, site staff and visitors to site. Some of the site-specific issues that will have to be addressed during the construction of the proposed development include:

- Managing demolition works and disposal of demolished materials.
- Identifying, storing and handling of hazardous and contaminated materials.
- Protecting existing roadways against damage, in particular in areas where excavations and retaining structures are proposed adjacent to roadways.
- Identifying, diverting, maintaining and connecting to existing live services.
- Managing vehicular and pedestrian traffic on the surrounding roadways for the duration of the construction works.
- Managing crane movements to limit lifting over live buildings and roadways.

All Contractors must progress their works with reasonable skill, care and diligence and, at all times, proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, pedestrians, road users and other interacting stakeholders.

Contractors are further required to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Health and Safety requirements will be further expanded and developed within the Main Contractor's Construction Management Plan and Construction Stage Health and Safety Plan required to be prepared by the Project Supervisor at Construction Stage, prior to the commencement of works on site.

2.4.9 Construction Waste Management Plan

A Construction Waste Management Plan (CWMP) has been prepared as part of the Planning Application. The document has been prepared in accordance with the Environmental Protection Agency's Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for construction and demolition projects.

The proposed development will give rise to a variety of waste streams. Given the scale of the development and the volumes of waste that will be generated during construction, it is imperative to ensure that waste management at the site is tightly controlled and has the least possible impact on the surrounding environment.

The purpose of the Construction Waste Management Plan (CWMP) is to ensure that waste storage and movement within the development takes place in a manner which complies with relevant legislation and has a minimal impact on the nearby existing commercial and residential areas and ensures, where prevention is not possible, that maximum reuse, recycling and recovery of waste with diversion from landfill, wherever possible.

Construction waste statistics from 2019 published by the EPA identify the main waste types generated in the construction industry in Ireland as set out in Table 2.3.

Table 2.3: EPA C&D Waste Statistics 2019

Waste Type	% of total (by weight)
Metal	2.2%
Segregated Wood, glass & plastic	0.3%
Bituminous mixtures	1.3%
Mixed waste	4.5%
Concrete, bricks, tiles and similar	6.9%
Soil and stones	84.8%

As a primary measure, waste generation will be avoided, where possible, by ensuring that an excess supply of building materials is not delivered to the site and that only the minimum materials required to meet the construction schedule are available on-site. Clean excavated materials will be reused on-site for backfill and landscaping.

Waste from demolition and construction will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996, as amended.

2.5 Site Services

Due to the nature of the site, a greenfield site, there are no existing surface water, storm water or watermain utilities on the site, however, there are in the adjacent roadways/footways. Most of the utilities adjacent to the site are understood to serve other properties in the surrounding areas. The existing and proposed site services are described in detail in Chapter 6 Material Assets. The following provides a summary of the existing and proposed site services.

2.5.1 Surface Water Drainage

There is no existing surface water drainage network within the existing site. It is evident that existing rainwater drainage from the site is by means of direct infiltration and percolation into the existing agricultural ground. The local groundwater flow direction is likely to mirror the site topography and catchment drainage. The greenfield run off from the site, due to the existing topography, travels in a north and northwest direction towards the Claureen River.

It is proposed to use a Sustainable Urban Drainage Systems, (SuDS) approach to storm water management throughout the site. This overall strategy aims to provide an effective system to mitigate the adverse effect of urban storm water runoff on the environment by reducing runoff rates, volumes and frequency, and reducing pollutant concentrations in surface water and emulate the greenfield runoff rate. The proposed SuDS features in the development are permeable paving on driveways,

cellular underground soakaways, petrol interceptors, a hydro-brake flow control, an infiltration basin and bio-swale.

All storm water generated by the catchment areas will flow by gravity and discharge via an Oil/Petrol Interceptor to 6No. soakaway units and 1No. Infiltration Basin, all strategically located. The storm water in the soakaways will infiltrate into the ground surrounding. The outfall from the infiltration basin will discharge via a hydro-brake manhole to a bio-swale running along the corridor adjacent to the N85 route. The storm water will then discharge to the Claureen River.

All on site storm water storage facilities have been sized to cater for all storm water generated within the site boundary of the development. The existing attenuation areas that are being used for the N85 road drainage are stand alone and separate to the proposed development drainage network. There are no links in the proposed storm water network to the existing N85 drainage attenuation tanks and therefore will not impact on the existing N85 drainage system.

2.5.2 Foul Water Drainage

It is proposed that the wastewater will flow through the gravity foul sewer network within the development to a pumping station located at the lowest point of the developable area in the northern section of the site. From here it will be pumped via a 110mm HDPE Rising Main to an existing 225mm diameter foul sewer which runs in a south easterly direction on Cahercalla Rd, c.105m east of the site entrance. A new Discharge Manhole is to be constructed at connection location in accordance with Irish Water Standard Detail STD-WW_29.

2.5.3 Watermain Layout

There is an existing 600mm diameter ductile iron watermain located on the western boundary of the N85. This is on the opposite side of the National Road to the site. There is also a 350mm diameter Asbestos watermain on the R474 circular Road on the eastern boundary of the site. Both watermains are owned and controlled by Irish Water.

It is proposed to connect a 150mm diameter watermain to the existing 350mm asbestos watermain at the site entrance on the R474 Circular Road. All watermain designs will be fully vetted by Irish Water prior to receiving an offer to connect. The 150mm diameter watermain will be constructed and connected in accordance with Irish Water requirements.

The water supply required for the proposed development shall be via a 150mm diameter watermain along the main spine road of the development. A 100mm diameter PE watermain will breach off this spine main to service the clusters of houses/Cul-de-sacs.

In accordance with Local authority/Irish Water standards, a water meter, and Logging Device (Larsen Type) are proposed at the connection into the proposed site. A sluice valve is also proposed to allow for possible disconnection of water meters by the Local Authority/Irish Water.

2.5.4 Flood Risk

A Flood Risk Assessment has been prepared and submitted as part of the Planning Application. The purpose of the Flood Risk Assessment is to identify, quantify, and communicate the risks of flooding, if any, to the proposed development.

The Flood Risk Assessment was carried out in accordance with the following flood risk management guidance documents:

- The Planning System and Flood Risk Management Guidelines for Planning Authorities (PSFRM)
- Flood Risk Management Climate Change Sectoral Adaptation Plan
- Clare County Development Plan
    - Ennis Municipal District Plan (Volume 3a)

The subject site is located approximately 2km southwest of the Ennis town centre, alongside Ennis Golf Club and the N85, adjacent to the River Claureen. The developable area and open attenuation pond are located outside the predicted flood extents of the Claureen River. All works within the floodplain are drainage associated, and will not impact existing ground levels, fluvial flow routes or floodplain storage. Therefore, it is estimated that risk of fluvial flooding associated with the proposed development is minimal.

Based on the indicative pluvial flood mapping presented in the Office of Public Works (OPW) Preliminary Flood Risk Assessment (PFRA), it is estimated that an area along the eastern site boundary may be liable to pluvial flooding during an extreme 0.1% Annual Exceedance Probability (AEP) pluvial flood event.

Surface water arising at the site will be managed by a dedicated stormwater drainage system and on-site attenuation in accordance with Sustainable Drainage Systems (SuDS) principles. Thus, it is predicted that the proposed development will not contribute to flood risk elsewhere in the area and will mitigate pluvial flooding within the proposed development.

Based on a review of Geological Survey Ireland (GSI) subsurface mapping of karst features, historic and predicted groundwater flooding in the area, and the PFRA study, there is no evidence to suggest liability to groundwater flooding at the proposed development site.

Based on previous flood studies for the area completed by the OPW, the proposed development site in not at risk of tidal flooding during a 0.1% Annual Exceedance Probability (AEP) Mid-Range Future Scenario (MRFS) tidal flood event, where coastal waters do not extend upstream to the vicinity of the subject site.

With reference to the PSFRM Guidelines, residential developments are classed as “highly vulnerable”, in terms of sensitivity to flooding. Such developments are considered appropriate in Flood Zone C—where there is less than a 0.1% AEP of flooding.

Based on the findings of this Flood Risk Assessment, it is estimated that all proposed residential dwellings and access roads are appropriately located within Flood Zone C. The sequential approach, as outlined in the PSFRM guidelines, has been appropriately adopted, locating the developable area outside the area of predicted flood risk.

2.5.5 Electricity and Telecommunications

There are existing power lines running along the eastern boundary of the site, this development proposes to underground the power line. There is a 10kV line running from south to north through the site that will also need to be undergrounded.

There will be 2No. new substations constructed. One at the rear of the creche located near the entry to the estate and the other located in the centre of the eastern boundary. The proposed substations will provide power to several mini pillars which will provide power to the residential dwellings.

2.5.6 Natural Gas

There is no existing gas infrastructure near the proposed development and all of the proposed residential units and the creche will be served by electric air-to-water heat pumps due to the requirement to meet Part L of the Building Regulations, of which L1 states that “A building shall be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of carbon dioxide (CO2) emissions associated with this energy use insofar as is reasonably practicable”. Heat pumps run at an energy efficiency of approximately four times greater than gas and are a renewable form of energy which is a requirement of the building regulations. No connections to the natural gas network will be required.

2.5.7 Telecoms / Communications

Virgin and eircom networks are installed along the central local road and the design of the network has allowed for a connection to the proposed residential development.

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

CHAPTER 3

Alternatives Considered

August 2022

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3 Alternatives Considered

3.1 Introduction

This chapter of the EIAR provides details on the evolution of the scheme design through the reasonable alternatives examined and provides an outline of the main alternatives considered and justification for the final proposed development.

3.1.1 Author Information and Competency

This section of the EIAR has been prepared by Deady Gahan Architects, in conjunction with Majella O'Callaghan, McCutcheon Halley Planning Consultants who holds a BA in Geography and Economics, MSc in Urban and Regional Planning and Diploma in Project Management. Majella has practised as a town planner for over 10 years and has directed the preparation of Environmental Impact Assessment Reports (EIARs) for a range of development types including residential and commercial. More specifically, this chapter of the EIAR was prepared by Eamonn Gahan, director of Deady Gahan Architects, BA (Hons) Architecture, Post Graduate Diploma in Architecture, MRIAI.

Eamonn Gahan, director of Deady Gahan Architects, studied architecture in the United Kingdom and worked for a number of years in London before returning to Ireland. He has over 20 years professional experience in designing residential, healthcare and commercial projects. Eamonn is a registered RIAI Architect, an RIAI Grade 3 Conservation Architect and a qualified Passive House Designer (Architects Registration No. 04148).

3.1.2 Reference to Guidelines Relevant to Discipline

This chapter will set out why the final layout was selected and provides details of alternative layouts considered throughout the design and consultation process. This serves to indicate the main reasons for choosing the layout as proposed.

The Annex IV(2) of the amended Directive 2014/52/EU, notes that the following is required in relation to the consideration of alternatives in the preparation of the EIAR:

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

Alternatives may be described at six levels: do-nothing alternative, alternative locations, alternative layouts, alternative design, alternative processes and alternative mitigation measures. Nevertheless, Section 3.4.1. of the 2022 EPA Guidelines stated that *"in some instances some of the alternatives described below will not be applicable"*. The consideration of the main alternatives in respect of the development of the subject land was undertaken by the Design Team and the main alternatives considered are identified below.

3.1.3 Methodology

Methodology as detailed in Chapter 2 Project Description.

3.1.4 Difficulties Encountered in Compiling Information

Several different scenarios and layouts were taken under consideration before arriving at the final layout which has been described in Chapter 2, Project Description. All these scenarios and layouts were developed in consultation with the Design Team. As it has been described in Chapter 2, Project Description, the site has presented several challenges and issues to be resolved along the design process.

3.2 Description of Existing Environment

A detailed description of the existing environment is provided in Chapter 2 Project Description.

3.3 Consideration of Alternatives

3.3.1 Do-Nothing Scenario

The 'Do-nothing' alternative is a general description of the evolution of the key environmental factors of the site and environs if the proposed project did not proceed.

The Ennis site comprises of a number of agricultural fields subdivided by a variety of hedgerows, with an undulating topography. The existing land-uses in the vicinity of the subject site comprise primarily residential, with a number of local services including a convenience supermarket, pharmacy, school, golf course, recreational uses, showgrounds, crèche and nursing home, all located within approximately 1 kilometre of the site entrance.

The site is located within the settlement boundary of Ennis and is subject to land use policies and objectives of Clare County Development Plan 2017 (Volume 3A – Ennis Municipal District). The site is located within the boundaries of the Ennis Settlement Area.

A planning application for this area was submitted to Clare County Council for Phase 1 of a two-phase development and was granted permission (CCC Ref: 18/811, ABP Ref: 306088-19). Phase 1 consisted of 99 no. units and Phase 2 was to be submitted as a future planning application. A third-party appeal was lodged to An Bord Pleanála in December 2019. The submissions on file and the Inspectors report were considered at a Board meeting held in May 2020 and the Board decided to issue a Section 137 Notice to all parties subject to the appeal. The Board considered the proposal density of 19 units per hectare was not a sufficient considering the sites location on lands in a suburban area at the edge of Ennis town. ABP considered the proposal '*lacked variety and distinctiveness'* and '*failed to provide high quality open space'* and 'poor connectivity to the surrounding area.'

Following a review of the proposed scheme a revised layout was submitted to An Bord Pleanála which comprised of 98 dwellings (ABP Ref: 306088-19). The revised layout provided a reduced development area of 3.22 hectares and a net density of 30.4 units per hectare. The new layout was granted by An Bord Pleanála in December 2020.

Following a review of the previous decision on site, it is considered that this proposed development proposes a high-quality layout and design, based on the provision of a mix of high-quality dwellings in three distinct neighbourhoods and creates a sustainable connection to Ennis town centre, prioritising pedestrians and cyclists. Due to the previous planning history, it is considered that the "do-nothing" scenario would result in a smaller sized development with a higher quantity of apartment blocks on the site which does not cater for the requirements in the area.

In addition to the above, under a 'do-nothing' scenario, the proposed development site would remain in its current condition as a greenfield site and it would not fulfil its residential zoning objective. Accordingly, there would be a negative/adverse effect on population, as this approach would fail to address the shortage of houses in Ennis. This development maximised the efficiency of zoned land and is therefore of critical importance.

There would be no increase in traffic under the 'do nothing' scenario, however, the site would fail to achieve the National Planning Framework, National Strategic Outcomes for compact growth and sustainable mobility, both of which have a positive climate and human health benefits.

A 'do-nothing' scenario is an inappropriate and unsustainable approach that would result in the inefficient use of a strategically located and easily serviced area of zoned residential lands. A 'do nothing' approach is likely to result in a neutral impact on the environment in relation to material assets, water, land, air, climate, cultural heritage, biodiversity and landscape.

3.4 Alternative Locations

The leading vision of the Applicant and the Design Team since the inception of the project has been to develop a high-quality residential scheme on zoned land. The site is located beside the N85 national road to its west, with pedestrian and vehicular connections to Ennis town centre to the east. There are a variety of connections to nearby towns and Shannon airport. Within the context of the site, a range of amenities are located within walking distance including various schools, recreational uses and shops.

The proposed site is currently zoned as low density residential. At a national level there are the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns & Villages), issued by the Department of the Environment, Heritage, Community and Local Government (DoEHCLG) in May 2009, provides guidance on the scale of development appropriate in suburban/edge locations (city and towns). It notes that larger towns, defined as having a population of 5,000 or more, such as Ennis should promote increased residential densities in appropriate locations and larger towns have the greatest potential for the creation of sustainable patterns of development. In many cases this is noted as being positive in terms of the provision of extra housing supply and the subsequent enhancement of local services.

The site would be considered within the location of 'outer suburban/'Greenfield' sites within cities and larger towns which recommends and encourages a density of 35-50 units per hectare while net densities less than 30 dwellings per hectare are generally discouraged. For the reasons set out above alternative locations were not considered.

The site offered significant opportunity to deliver a large residential development on underutilised greenfield site in close proximity to existing services and in close proximity to Ennis town centre and the site has capacity to absorb development without significantly effecting the existing landscape and visual characteristics of the surrounding area. In terms of alternative locations therefore, the location of the proposed within the development boundary of Ennis is entirely appropriate for residential development and the site is capable of delivering housing as a scale which is supported at a national level. Overall, this location would result in an increased number of new homes being delivered on the proposed development site with a positive effect for population. Accordingly, having regard to the significant positive benefit that could be achieved and the fact that the amenities of existing dwelling surrounding the site will be safeguarded, this location was deemed appropriate.

3.5 Alternative Layouts

The design of the scheme has been an iterative process, led by Eamonn Gahan (director of Deady Gahan Architects) in conjunction with the Design Team and is presented in the Architectural Drawings and the Planning and Design Statement, which should be read in conjunction with this chapter of the EIAR.

The final layout, presented in the Architectural Drawings and the Design Statement which should be read in conjunction with this chapter of the EIAR, has evolved since the initial design stage subsequent to a number of design team meetings and in response to pre-planning meetings with Clare County Council and An Board Pleanála. The scheme has undergone a rigorous appraisal, which has led to a final layout that responds appropriately to the site characteristics, opportunities and constraints.

Section 3.5.1 sets out the intermediate design progressions of the scheme and includes figures showing the proposed layout at each stage.

3.5.1 Layout – Option A

Figure 3.1: Site Plan – Option A

This layout was designed by architects working with the sites previous developer and was granted by An Bord Pleanála in December 2020 (ABP Ref: 306088-19), comprising of 98 units and a net density of 30.4 units per hectare.

Positive characteristics:

- The layout provides a high density for the area while incorporating a broad mix of unit types for the development.

Negative characteristics of the development:

- Limited hedgerows have been retained.
- Poor design concept which fails to provide a range of high quality usable open spaces and to establish a sense of place.
- The layout proposes one moderately sized open space in the center of the site.
- The layout is dominated by streets and car parking surface: the layout proposed standard parking arrangements everywhere with little variation in street width.
- The layout doesn't correctly respond to the noise buffer to the west of the site. By facing rear gardens onto this, the private amenity space could be disturbed by the noise of the N85 road.
- The layout lacks meaningful pedestrian and cycle facilities: there is a segregated cycle path that ends abruptly on a street and starts again after forcing cyclists to use the internal street network.
- The design of the layout, a large portion of the buildings within the proposal are high density units which don't reflect the requirements of the area.
- The location of the crèche in the centre of the development with the play area exposed on 3 sides to the public realm.

3.5.2 Layout – Option B

Following the previous design permitted on site, it was decided at an early stage after taking on the project that the entire site should be considered rather than a small portion as per the previous grant of planning. This layout sought to incorporate a larger quantity of housing arranges around a looping street network to avoid the need for cul-de-sacs and allow for easy access through the development. A range of open spaces were also developed around the site, surrounded by houses and this scheme is illustrated in the figure below.

Figure 3.2: Site Plan – Option B

This layout proposed the following Positive Characteristics:

- A series of open spaces were located centrally in the site and surrounded by houses.
- The scheme provided a definition of a hierarchy of streets and introduction of some shared surfaces.
- Houses were faced westwards to correctly address the noise buffer from the N85.

This layout proposed the following Negative Characteristics:

- The layout of the development was very linear and didn't reflect the topography of the site. The uninterrupted length of the streets wouldn't comply with DMURS standards.
- Various open spaces were located around the site but were very limited in size and usability.
- Pedestrian and cycle connection through the site needed further consideration as it required many street crossings.
- Lack of connections out of the site other than possible connections to the south of the site.
- Existing trees on site were not taken into consideration other than the existing hedgerow in the center of the site.
- The location of the Crèche parking at the site entrance wouldn't address the road frontage correctly and could cause traffic issues at the vehicular access route to the site.

3.5.3 Layout – Option C

A Section 247 meeting with Clare County Council was held on the 15th October 2021. Following this meeting, key items were discussed, and the feedback provided was incorporated into the layout. The scheme evolved from the initial conceptual design following the Section 247 meeting with Clare County Council.

Figure 3.3: Site Plan – Option C

Following further discussions and consultation with the applicant and the design team, it was decided that the layout of the scheme should better reflect the topography of the site and greater

consideration for the retention of existing trees/hedgerows was needed. The proximity to the Golf Course to the east and the quality of the open spaces were also key items that were addressed. The housing mix was also increased to cater for a wider range of end user in the Ennis area.

Option C proposed the following positive characteristics:

- This layout proposed several more generous open spaces located around the site which were surrounded by a range of residential units.
- The layout provided green areas and parks which were crossed by pedestrian and cycle paths that connect throughout the site: this provided a north-south and east-west pedestrian connection.
- Definition of a hierarchy of streets and introduction of several shared surfaces.
- The location of the crèche was moved to address the public road to the east in order to interact with the wider community.
- A series of feature corner units were developed to properly address open spaces and important junctions to aid in place-making.
- A greater emphasis on the retention of existing landscape features.
- The site has been split into 3 no. character areas to enhance the quality and distinctiveness of the scheme.

Option C proposed the following negative characteristics:

- The shared surface and open spaces areas and plazas need a better definition and provide more details.
- Possible additional connection points to the surrounding areas should be reviewed.
- No provision for larger 4 bed units on site.
- Limited connection to surrounding facilities to the south of the site.
- Lack of generous open space elements in the north of the site.

3.5.4 Final Scheme

The final scheme is informed by the examinations of the various alternatives (outlined previously) and has evolved since the initial design stage through several redesigns. It has been developed through various iterations and implementing changes during the Pre-Application process through comments received from Clare County Council and An Bord Pleanála.

Figure 3.4: Site Plan – Final Layout

The positive characteristics of the previous layouts are maintained but some amendments were made to improve the scheme and led to a new high quality residential development that responds appropriately to the site characteristics, opportunities and constraints. The permeability of the site was enhanced by additional pedestrian connections to the west of the site along the N85. A wider mix of units were incorporated into the site to provide for a wider range of end users. The number of units also increased to 289 units with the addition of these new unit typologies.

The final layout provides the following positive characteristics:

- Several open spaces and plazas, in various scale, shape and materials, located around the site and surrounded by buildings.
- Definition of a hierarchy of roads and introduction of several shared surfaces which have been well defined and studied in all their aspects.
- A central plaza with planted elements has been designed near the entrance of the site surrounded by larger scale buildings to better define the area.
- A greater unit mix has been established with the introduction of possible 4 bed units located in various sections of the site.
- The landscape strategy provided a better focus on connectivity and permeability through the site and wider area which consisted of the provision of 2 no. proposed pedestrian connections to the N85 to the west of the site have been incorporated into the site layout to allow for additional access points and walking / cycle routes and Provision of 2 no. pedestrian connections to the south have been incorporated in the scheme with additional footpaths connecting the site to Circular Road.
- The layout to the north of the site has been redesigned in order to better address the zoned open space to the north and to provide passive surveillance for pedestrians and future occupiers of the development.
- 3 storey unit types have been developed to address the entrance plaza area and create a sense of scale upon entering the site.
- A large portion of existing trees and hedgerows have been retained throughout the Site.
- The open space has been reconsidered and designed to incorporate play elements and existing vegetation.
- The crèche has been redesigned in order to better address the entrance onto Circular Road and the entrance to the Site, while also respecting the adjacent existing houses.
- Use of several traffic calming measures.

Throughout the design evolution of the subject site, the disadvantages of each early and alternative option were examined, with solutions considered in detail and the promising elements threaded through to the final and preferred strategy. As a result, it is our opinion that the proposed final strategy is the most appropriate scheme with the least environmental effects. The multidisciplinary design and EIAR team placed respecting the existing environment and achieving environmental enhancements at the centre of the design development process. The final scheme is consistent with both local and national planning policy, and will create a new community with a strong identity, within a built-up urban environment. This chapter demonstrates that the proposed preferred alternative performs better than other alternatives considered during the design process.

3.6 Alternative Design

The proposed residential development has been prepared in accordance with the requirements of the "Clare County Development Plan 2017 (Volume 3A – Ennis Municipal District)", the "Sustainable Urban Housing: Design Standard for New Apartments – Guidelines for Planning Authorities (2018)" manual, the "Quality Housing for Sustainable Communities (2007) manual, the "Urban Design Manual – A best practice guide (2009)" and the "Design Manual for Urban Roads and Streets".

The design has therefore been informed by the need to achieve an appropriate density in the context of the "Sustainable Residential Guidelines for Planning Authorities", by the need to provide a good mix of housing typologies which meet current market demand and by the need to deliver a good quality residential development within the existing urban environment. It is also considered that the proposed development will have a positive impact on human health due to the quality open spaces and sustainable modes of transport available to future residents.

The design of the layout has also been informed by the characteristics and the constraints of the site that consists of a sloping topography with some native hedgerows that subdivide the greenfields. The project is focused in following and working with the contours and in retaining the native trees and hedgerows where possible that give a distinctive character to the development.

Permeability is also very important and is achieved by providing connections between the proposed development, the N85, and the recently constructed development to the south with pedestrian connections to these locations included as part of this proposed development.

The overall development provides a mix of style, size and type of housing, arranged to provide a selection of units in varying configurations. The various housing types add to the choice available in the area ensuring the provision of homes that will meet the needs of the future residents of Ennis. For all these reasons the Design Team consider that the proposed design and layout is the optimal scheme for the subject site.

3.7 Alternative Processes

This is not considered relevant to the EIAR having regard to the nature of the proposed residential development. The proposed construction work comprises relatively of standard building construction processes, as such there are no specific alternative construction processed identified in this EIAR. It is also considered there is no new or technical challenging operational techniques required and no alternative operational process have been considered as part of this development.

3.8 Description of Secondary and Off-Site Developments

No significant secondary enabling development is necessary to facilitate the proposed residential development. It is considered that the planning application includes details of the necessary infrastructure works, which are required to facilities this development. These works are assessed within this EIAR.

3.9 Cumulative Impact

Each design iteration considered any potential impacts on neighbouring developments (existing, under construction and future), transforming the edges of the scheme to provide an appropriate transition to its direct context and reducing the potential of cumulative impacts.

The noise buffer consisting of existing hedgerows with supplemented planting protects the scheme from the N85 to the west, with existing hedgerows creating boundaries to the south, east and north of the site.

3.10 Mitigation Measures

The mitigation measures outlined throughout the various EIAR chapters are considered appropriate for the proposed development therefore no alternative mitigation measures were considered in the preparation of this chapter.

Proposed Strategic Housing Development at
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CHAPTER 4

Landscape and Visual Impact Assessment

August 2022

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4 Landscape and Visual Assessment

4.1 Introduction

This Landscape and Visual Assessment has been prepared by doyle + o'troithigh landscape architecture. The purpose of this assessment was to review the existing landscape setting of the site, to assess the likely potential visual impacts arising from the proposed development on the existing landscape and describe proposed mitigation measures to reduce any likely adverse potential visual impacts on the receiving environment. This LVIA was prepared by David O'Sullivan, Landscape Architect, M. Ag. Sc. (HORT)., M.L.A, member of the Irish Landscape Institute and has experience in preparing a diverse range of Visual Impact Assessments covering residential, sports facilities, care homes, commercial and renewable energy. The Council of Europe defines 'Landscape as an area, as perceived by people, whose character is a result of action and interaction of natural and/or human factors'. The definition broadens the concept of landscape further than solely framed in terms of aesthetics and visual amenity. This definition of landscape is what will be used in this report.
This assessment should be read in conjunction with the 10 No. photomontages as prepared for the scheme by GNet3D and included in planning application. The views were taken in autumn 2021 when deciduous trees were partially bare and the views could be considered as part winter views, i.e., when there was some deciduous foliage screening views. The photomontage positions were selected following a site visit to assess the extent of overlooking from adjoining properties and an assessment of locations around the site area where there was the potential of views of the development which could be considered as creating a visual impact.

4.2 Research Methodology

This assessment has been based on the following guidance:

- Guidelines on the Information to be contained in Environmental Impact Statements', Environmental Protection Agency, 2002.
- 'Revised Guidelines on the information to be contained in environmental impact statements' - Draft September 2017
- 'Advice Notes on Current Practice in the preparation of Environmental Impact Statements', Environmental Protection Agency, 2003.
- 'Guidelines for Landscape and Visual Assessment', 3rd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- Urban Development & Building Heights, Dept. of Housing Planning & Local Government 2018

This assessment has involved:

- Undertaking a desk-top study of the site; including reviewing Ordnance Survey mapping and aerial photography.
- Reviewing the plans, sections, and elevations of the proposed scheme.
- A review of statutory planning and other documentation in order to ascertain the local and wider significance from a visual perspective; and
- Visiting the site and surrounding area in November 2021 to assess the site's location and the local characteristics of the area to assist in the compilation of the LVIA Report.

4.2.1 Nature of Impacts

Impact on landscape arising from development has two distinct but closely related aspects:
Form of change to character of the landscape that arises from the insertion of the proposed development into the receiving environment.

- Degree of change to character of the landscape that arises from the insertion of the proposed development into the receiving environment.
- It is recognised that the combined impact on character and views will draw responses, the significance of which will be partly informed by an individual's subjective perception of how much the changes alters the existing context.
- The assessment of landscape and visual impacts includes: -
  - Direct impacts upon specific landscape elements and buildings within and adjacent to the site.
  - Effect on the overall pattern of the landscape elements that give rise to the character of the site and its surroundings.
  - Impacts upon any special features or interests in or around the site.
  - Direct impacts of the scheme upon views in the landscape.
  - Overall impact on landscape character and visual amenity.

4.2.2 Significance Criteria

Based on the EPA Advice Notes and Guidelines the following terms are used to describe the degree, quality and duration of an impact and are provided in Table 4.1 below.

Table 4.1: Impact Significance Criteria

Impact Criteria	Description
Profound Effects	An effect which obliterates sensitive characteristics
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters the majority of a sensitive aspect of the environment
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with the existing and emerging trends
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Imperceptible	An effect capable of measurement but without significant consequences

Terms used to describe the quality of change are:

Positive impact: A change that improved the quality of the environment.
Neutral impact: A change that does not affect the quality of the environment.
Negative impact: A change that reduces the quality of the environment.

Terms relating to the duration of impacts as described in the EPA Guidelines are listed as follows:

Temporary impact: Lasting one year or less.
Short-term impact: Lasting one to seven years.
Medium-term impact: Lasting seven to fifteen years.
Long-term impact: Lasting fifteen to sixty years.
Permanent impact: Lasting over sixty years.

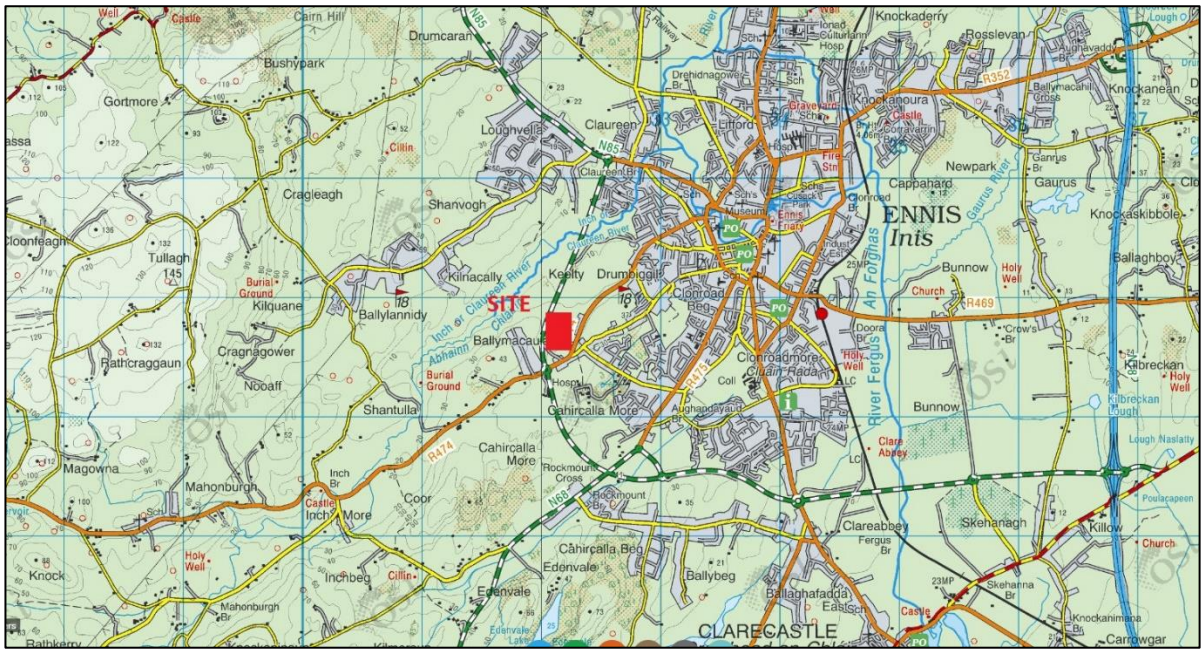

Figure 4.1: Ennis SHD: Site Location and Context (My Plan Map)

4.3 Receiving Landscape Environment

4.3.1 Policy and Planning

Policy Considerations

The relevant designated sites, local authority designations, archaeological features and protected sites were assessed from a landscape and visual impact basis with respect to the development proposals as contained in this submission.

Designated Sites

National Heritage Sites – National Monuments

There are several National Monument sites that are close to the site and have some potential to be visually impacted by the development proposals. However, in this case, distance from site and intervening vegetation and buildings generally screens views of the monuments from the site.

CLO33-171 Ringfort Rath. This feature is located approx. 200m to the south of the site. Intervening vegetation and buildings screen views of this national monument and therefore there would be no impact from the development proposals.

CLO33-170 Lime Kiln. This recorded monument is screened by the berm that runs parallel to the N85 and therefore there are no views of this feature from the site.

CLO33-081 18/19C House. The house is approx. 500M to the northeast of the site and is surrounded by screening vegetation. There would be no visual impact on this feature from the proposed development due to separation and intervening vegetation.

CLO33-078 Enclosure. This monument is 600M to the west of the site is described as not being visible at ground level and therefore there would be no impact from the development proposals.

CLO33-074 House. The house is approx. 1Km from the site and is screened from the site by the roadside berm and intervening vegetation.
CLO33-075 Ringfort. Located 700M to the west of the site and is screened by topography and vegetation.

CLO33-114002 – Described in Archaeology.ie as a Ringfort / Cashel. It is located 600M to the west of the site and is screened from view by the Beechpark housing development.

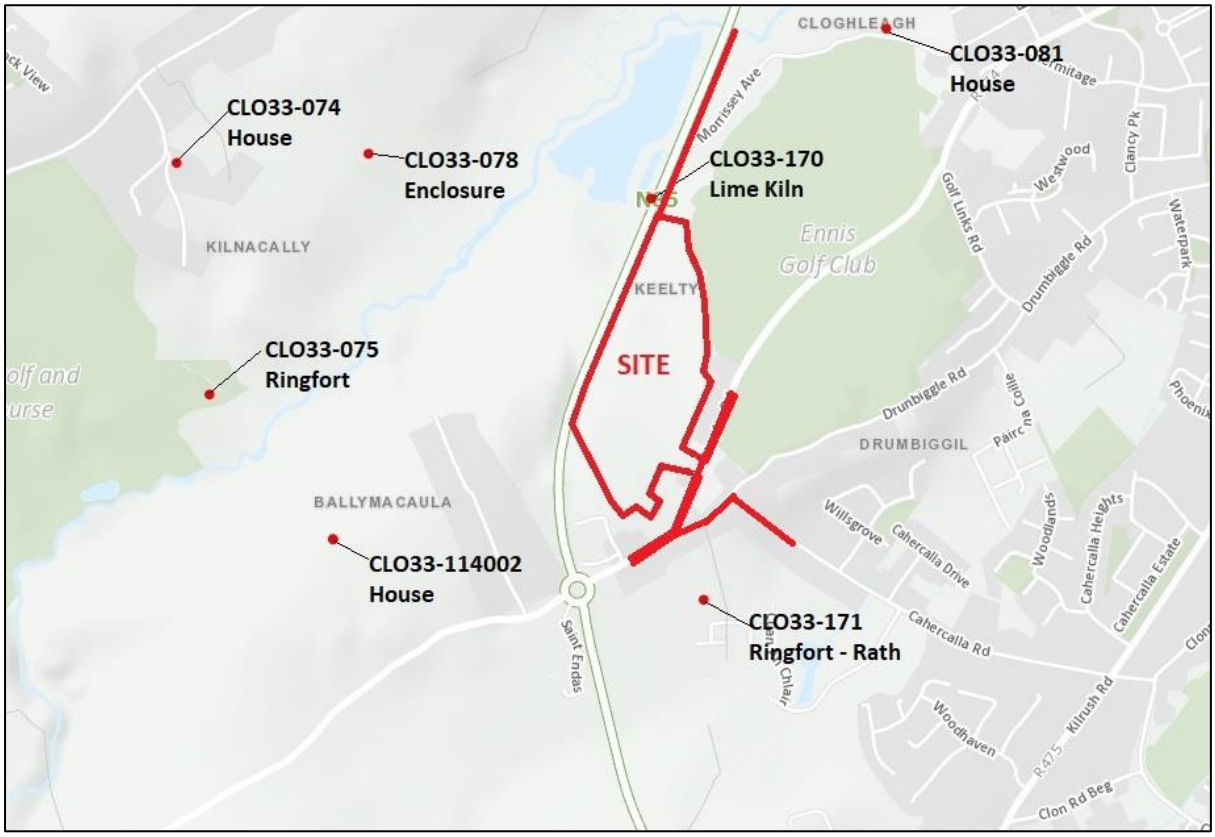

Figure 4.2: Ennis SHD: National Monuments adjoining site (My Plan Map)

National Inventory of Architectural Heritage (NIAH)
There are a number of NIAH records located in the centre of Ennis approx. 1.5Kms to the northeast of the site. Distance from the site and intervening vegetation and buildings screen views of these buildings from the site.
Cahircalla House 1800-1820 (NIAH Ref. 20403310) is situated 400M to the south of the site and is screened from the site by topography, vegetation, and intervening buildings and therefore there would be no visual impact from the development proposals on this feature.

Designated Natura 2000 Sites

There are a number of Designated Natura 2000 Sites in the vicinity of the site: -

Pouladatig Cave SAC (Ref. 000037) and pNHA. Located over 1.8Kms. to the west of the site and is screened by topography and vegetation and therefore no visual impact arising from the development proposals.

Cahircalla Wood pNHA. This feature is 700M southwest of the site and is screened from the site by topography.

Newhall & Edenvale SAC (Ref. 002091) & pNHA. This designated site is 1.8Kms south of the site and there is no visual connection between the location and the site.

Fergus Estuary and Inner Shannon North Shore SPA (Ref. 004077) & pNHA. The distance of 4Kms southeast of site means that this protected site is not visible.

Lower River Shannon SAC (Ref. 002165). The Lower River Shannon flows through the centre of Ennis 1.2Kms to the west of the site. The river is not visible from the site and therefore there would be no visual impact arising.

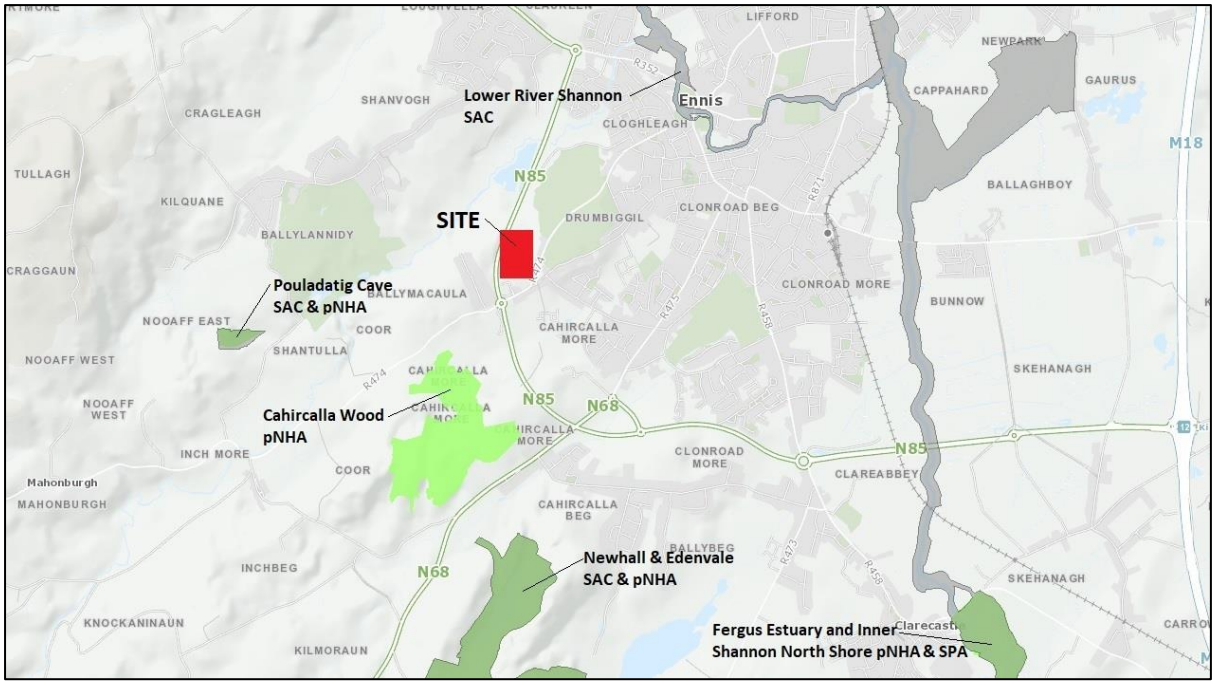

Figure 4.3: Ennis SHD: Protected Sites in the vicinity (Heritage Map)

Clare Co. Co. Development Plan 2017-2023

Chapter 13 of the Clare Co. Development Plan (CDP) sets out the objectives required to sustainably manage the diverse landscapes of the county: -

Clare Co. Co. – Landscape Character Assessment

(The Draft Clare County Development Plan 2023-2029 is to be adopted in the near future and it was reviewed for this report with respect to referencing any important amendments to the 2017- 2023 CDP) Clare Co. Co. stated Objective is to encourage the utilisation of the Landscape Character Assessment of County Clare and other relevant landscape policy and guidelines and to have regard to them in the management, enhancement, and promotion of the landscapes of County Clare. The Development Plan also lists a range of strategic objectives related to landscape: -

- To ensure the implementation of the National Landscape Strategy for Ireland 2015-2025 in County Clare.
- To implement the 'Clare's Living Landscapes' approach to landscape management and enhancement throughout the County.
- To encourage the utilisation of the Clare County Landscape Character Assessment in both the preparation and assessment of planning applications.
- To utilise the 'Clare Living Landscapes' approach to ensure that development in the County takes place in the location /landscape deemed most appropriate.
- To sustain the natural and cultural heritage of the County.

Landscape Character Types

County Clare is divided in 26 distinct types of landscape, i.e., are distinct types of landscape that are relatively homogenous in character.

The site is located in Type 20, Low Drumlin Farmland but is adjacent to Type 1 Built up Areas. The presence of adjoining residential development and road networks would put the site into the Built-up category than in open drumlin farmland.

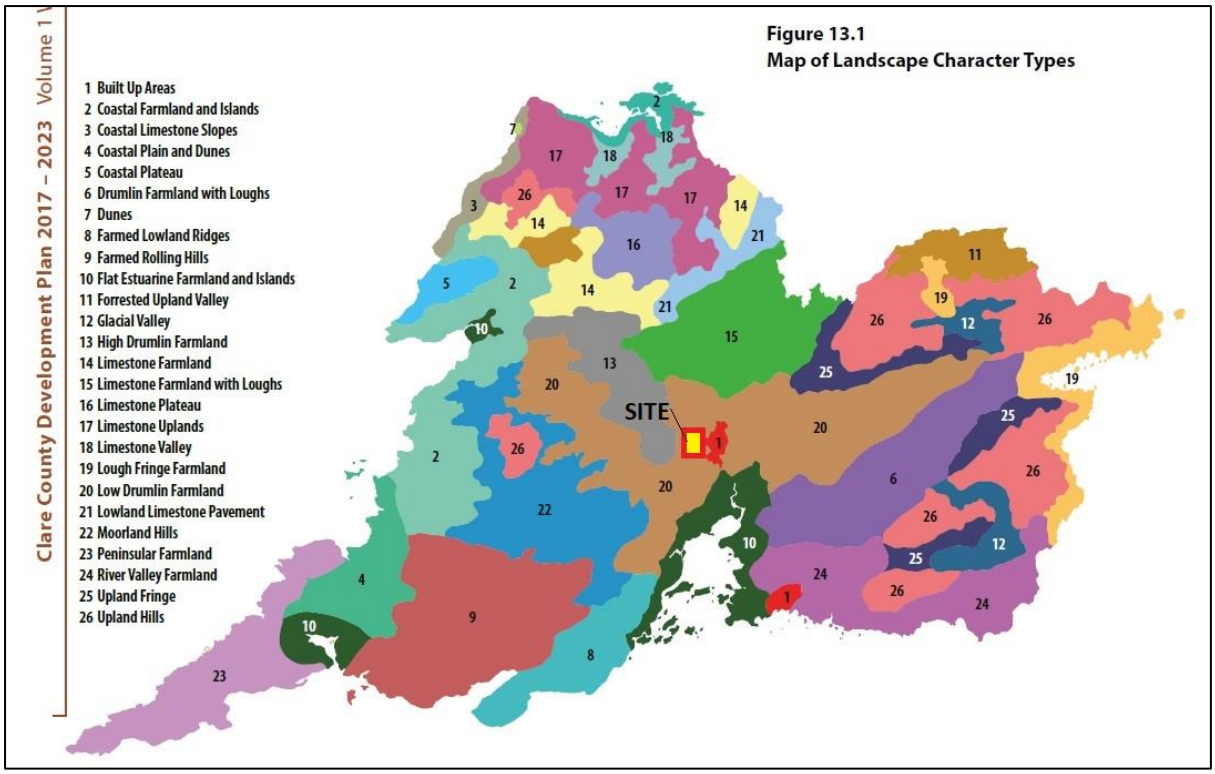

Figure 4.4: Ennis SHD: Landscape Character Types (CDP 2017-2023)

Landscape Character Areas

The site location is classified as being in Character Area 13 Ennis Drumlin Farmland but while the drumlin farmland character is visible to the west of the site the site is more of an urban character than farmland with housing, roads and golf course being the dominant features of the immediate area around the site.

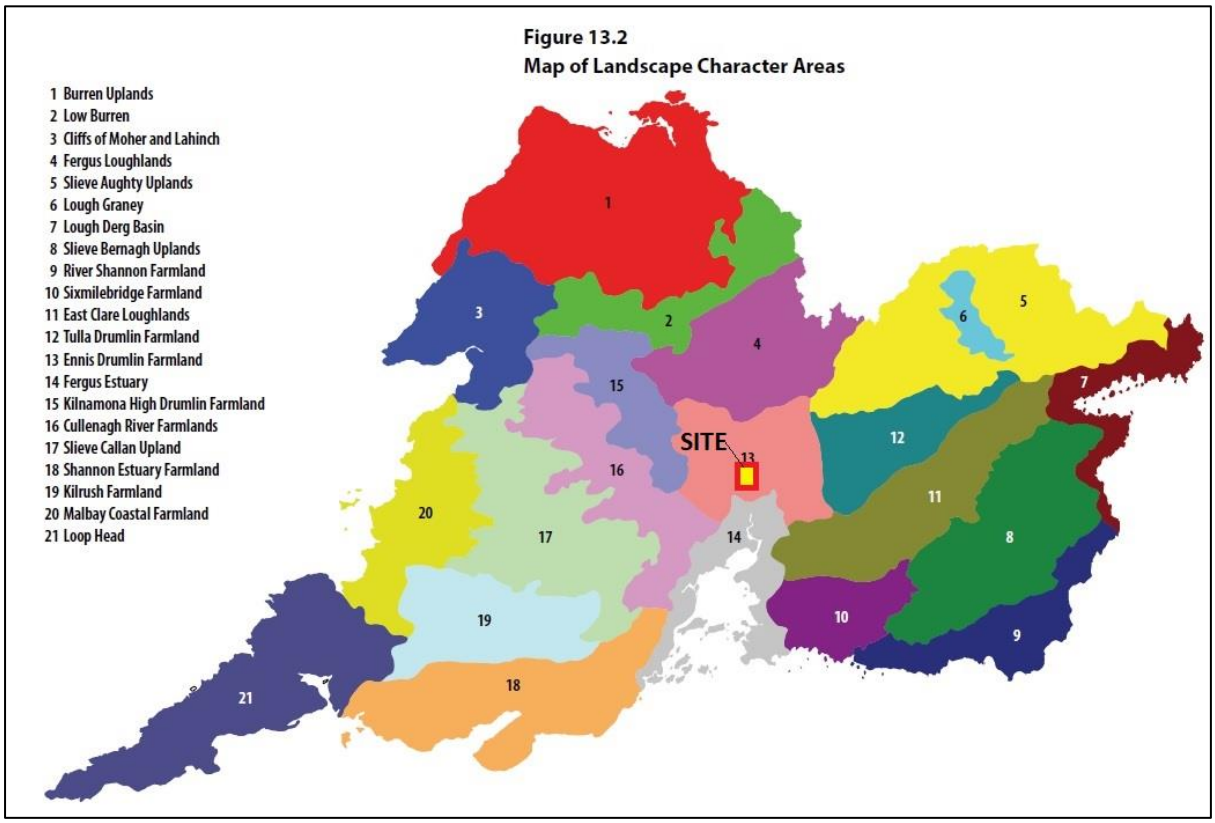

Figure 4.5: Ennis SHD, Landscape Character Areas (CDP 2017-2023)

Living Landscapes

The CDP refers to the fact that the word 'Landscape' can be seen as a restrictive term which often refers only to appearance with little regard for communities that shape it. The CDP describes the concept of 'Living Landscapes' where different parts of the County are regarded as having different potential in terms of how communities can pursue their ambitions and aspirations. The Living Landscapes are further classified as: -

Settled Landscapes – area where people live and work

Working Landscapes – intensively settled and developed areas within settled landscapes

Heritage landscapes - natural and cultural heritage are given priority and where development is not precluded but happens more slowly and carefully.

The site is located in Western Corridor Working Landscape where *It is an objective of the Development Plan: A To permit development in these areas that will sustain economic activity and enhance social well-being and quality of life - subject to conformity with all other relevant provisions of the Plan and the availability and protection of resources.*

Woodlands Trees & Hedgerows

The CDP refers to the fact that townscapes and landscapes *generally benefit from the presence of trees as they soften the line of buildings, contribute to a sense of place, act as wildlife habitats and corridors and provide scale to buildings and streets. They also filter out noise, dust, and pollutants. Plant and soil cover act as important carbon sink, retain moisture and prevent flooding*. The CDP states that where felling of trees is necessary for development that: - I To require, where possible, *that all trees felled because of development proposals be replaced at a minimum ratio of 10 new native species per 1 tree felled.* A number of trees and sections hedgerow are to be removed as part of the development

proposals, but a significant number of trees are being proposed as well as areas of native species planting to enhance future biodiversity on the site.

Views & Prospects

There is a scenic route according to the Co Clare CDP is located on the R474 Miltown Malbay road approx. 15Kms to the west of the site. Other listed views are located towards Corofin and the Burren Area approx. 13Kms northwest of the site. Distance from site and intervening topography means there would no visual impact on these views from the development proposals.

Zoning

The site is Zoned Ri Residential with Recreational Zoning to the east and Agricultural Zoning to the west.

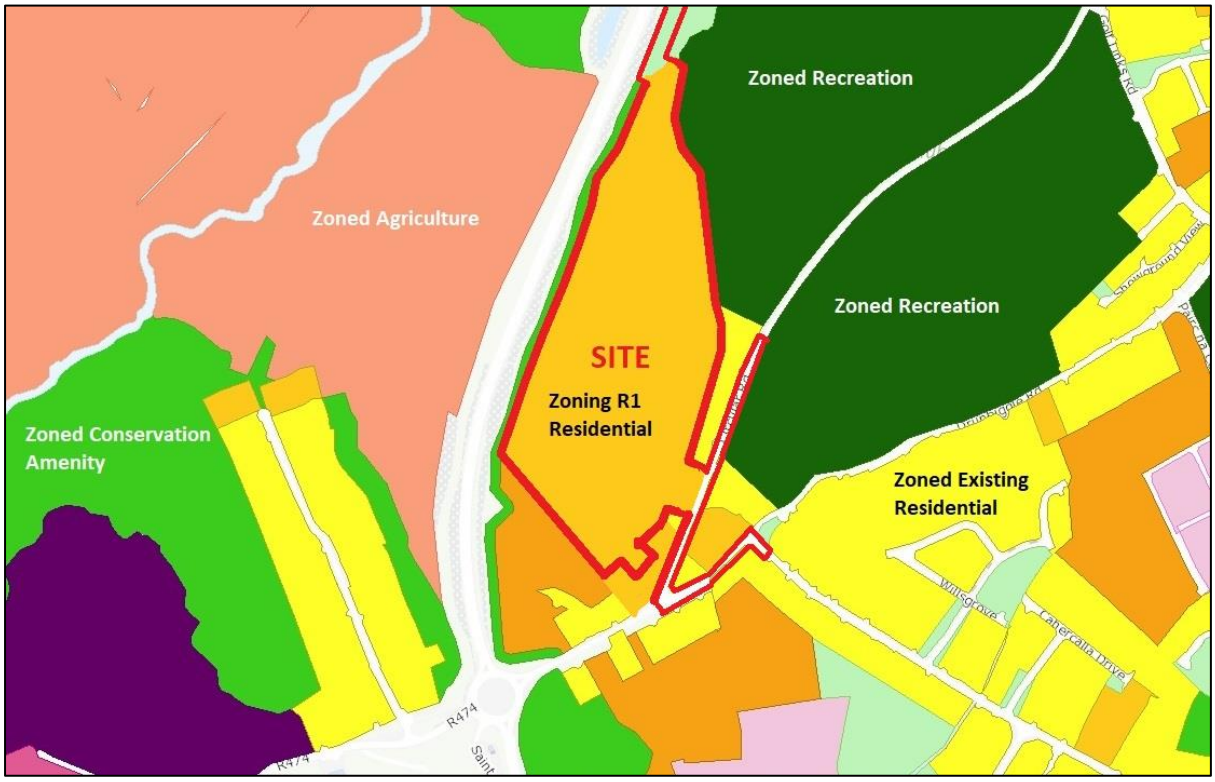

Figure 4.6: Ennis SHD, Local Authority Zoning (My Plan)

Urban Development and Building Heights

In the Guidelines for Planning Authorities, The Dept. of Housing, Planning and Local Government, 2018 refers to the National Planning Framework and policy objectives to provide more compact forms of urban development. It quotes National Planning Objective 13 *'In urban areas, planning, and related standards, including in particular, building height and car parking will be based on performance criteria that seek to achieve well-designed high-quality outcomes in order to achieve targeted growth. These standards will be subject to a range of tolerance that enables alternative solutions to be proposed to achieve stated outcomes, provided public safety is not compromised and the environment is suitably protected.'* It is proposed that this development adheres to these guidelines while respecting the environment and the case of this report the Landscape & Visual Impacts of the development.

Pre-Planning Meeting with Clare Co. Co

A pre-planning meeting was held on 15th October 2021 between Clare Co Council, Glenveagh Homes, and consultant Planners, Architects, Engineers and Landscape Architects. The main issues related to residential density but landscaped related issues such as, open space layout and the noise buffer to the N85 were also discussed. The Opinion issued by the An Board Pleanála was subsequent to a tri-partite meeting which took place on the 25th of April, 2022 between Clare County Council, Glenveagh Homes, An Bord Pleanála and the consultant Planners, Architects, Engineers and Landscape Architects. Within the opinion issued by the Board, the following additional information was also requested to be submitted with the application for permission under Article 285(5)(b) with regards to Landscaping – '*A detailed landscaping plan clearly illustrating the quantum and functionality of all areas designated for public open space. The landscaping details should include, inter alia, the inclusion of useable space for play provision, a detailed tree survey and proposed tree planting scheme and shall clearly indicate the quantum and designated areas of useable for differing age categories'.*

Surrounding Environment

The site is located at Ballymacaula, Circular Road, Ennis, Co. Clare approximately 1.5Kms to the west of the town centre of Ennis. The N85 road bounds the west of the site with the R474, Circular Road, passing to the east. Ennis Golf Club adjoins the eastern boundary of the site and the Ballymacaula View housing estate, which is under construction, adjoins the western boundary.

4.3.2 Site Description

The total developable site area is 8.9 Ha. and is composed rough agricultural grazing lands set out in 8 small field units with extensive spreading hedgerows. The site area is a mixture of localised high ground and hollows with frequent rock outcrops visible in the ground. The ground generally slopes from the south (31M) to the north (9M) with the ground rising also towards the R474 to the east. There are panoramic views of the surrounding countryside from the higher parts of the site with the drumlin landscape and spreading suburbs of Ennis visible to the west and north. The N85 is in a cutting with associated roadside tree screen planting reducing its visibility from the site. The R474 is set on rising ground and the one-off group of housing to the east backs onto the site have clear views into parts of the site. There is an estate of houses at Beechpark, Ballymacaula, set on high ground to the southwest of the site which are visible from the site. The houses under construction at Ballymacaula View to the southwest of the site are set on rising ground and have views into the site albeit screened by an existing hedgerow.

Site Images

A selection of 6 No. views (See Fig. E below for locations) has been prepared to show the character of the existing site. The images were taken in November 2021 when the deciduous trees are in autumn form and the conditions were misty at the time of the visit.

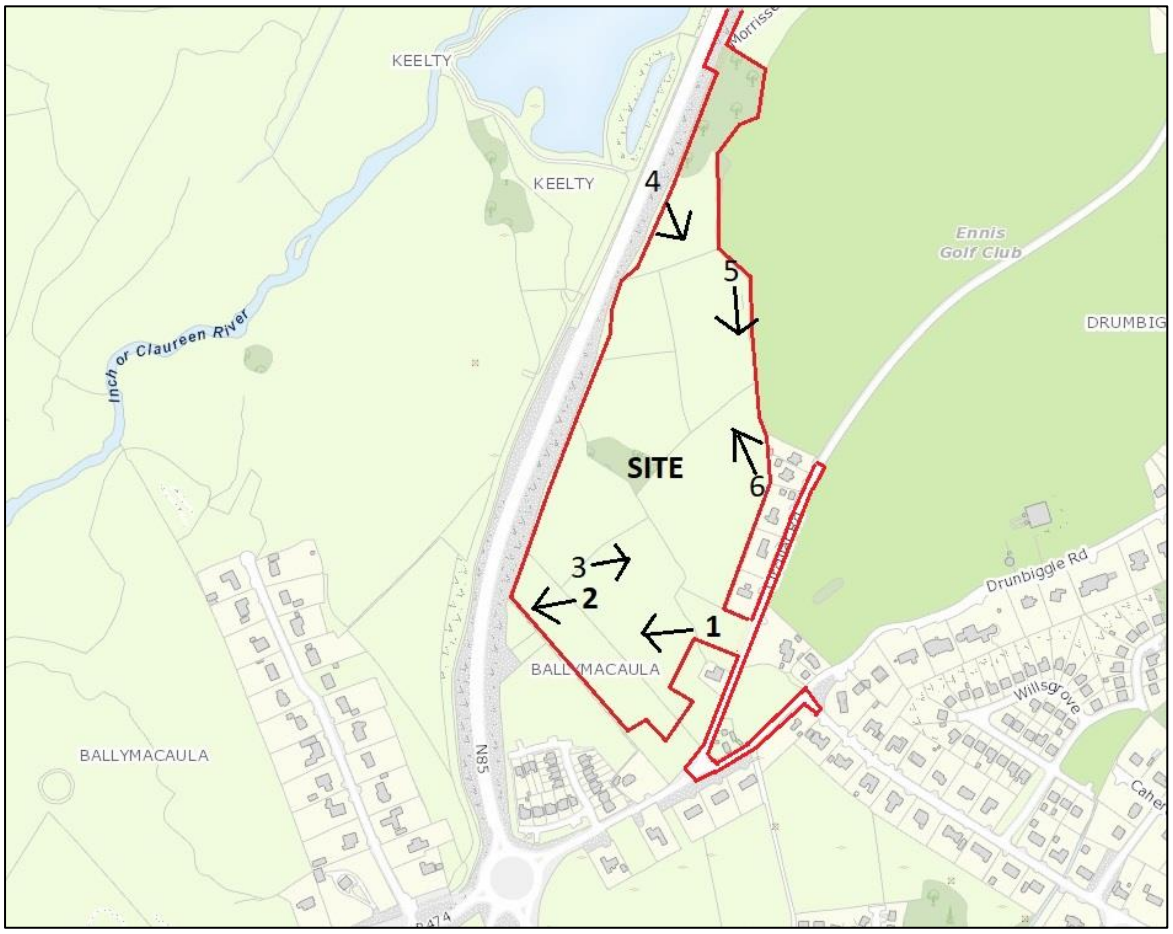

Figure 4.7: Ennis SHD, Site Images (My Plan Map)

Image 01 – View west from site

Image 02 – View west towards Ballymacaula View houses

Image 03 – View east towards Circular Road

Image 04 – View southeast from site

Image 05 – View south from site.

Image 06 – View northwest from site

4.3.3 Key Receptors

NORTHERN RECEPTORS – These receptors are composed of housing estates to the northwest of Ennis Town, namely Shanvogh and Cloghleagh. Some of the houses in the elevated housing of Aisling and Ros na Ri approximately 1Km distant are clearly visible from the site, however given their elevated position with panoramic views, any development works to the south of this location would be visible. The proposed development in this case would be seen as a natural extension of urban Ennis.

EASTERN RECEPTORS – The main receptors from the east are the group of houses that back onto the site from the R474. As the houses are on higher ground above the site, they will have clear views of the development. Proposed house type selection and boundary treatment will mitigate visual impact on these houses. The higher ground of the golf club lands obscure views further to the east at Drumbiggle and therefore there would be no visual impact arising from this location.

SOUTHERN RECEPTORS – The houses at Beechpark, Ballymacaula are set on elevated ground and have views over a wide area including the site. The newly developed houses at Ballymacaula View will also have views into the site where it is proposed to have a line of housing backing onto Ballymacaula View.

WESTERN RECEPTORS – Some of the houses at Beechpark, Ballymacaula which back out towards the site will have views across the N85 to the site. The elevated housing at Killnacally and Ballylannidy, approximately 1Km to the west, will have views of the site from their elevated location.

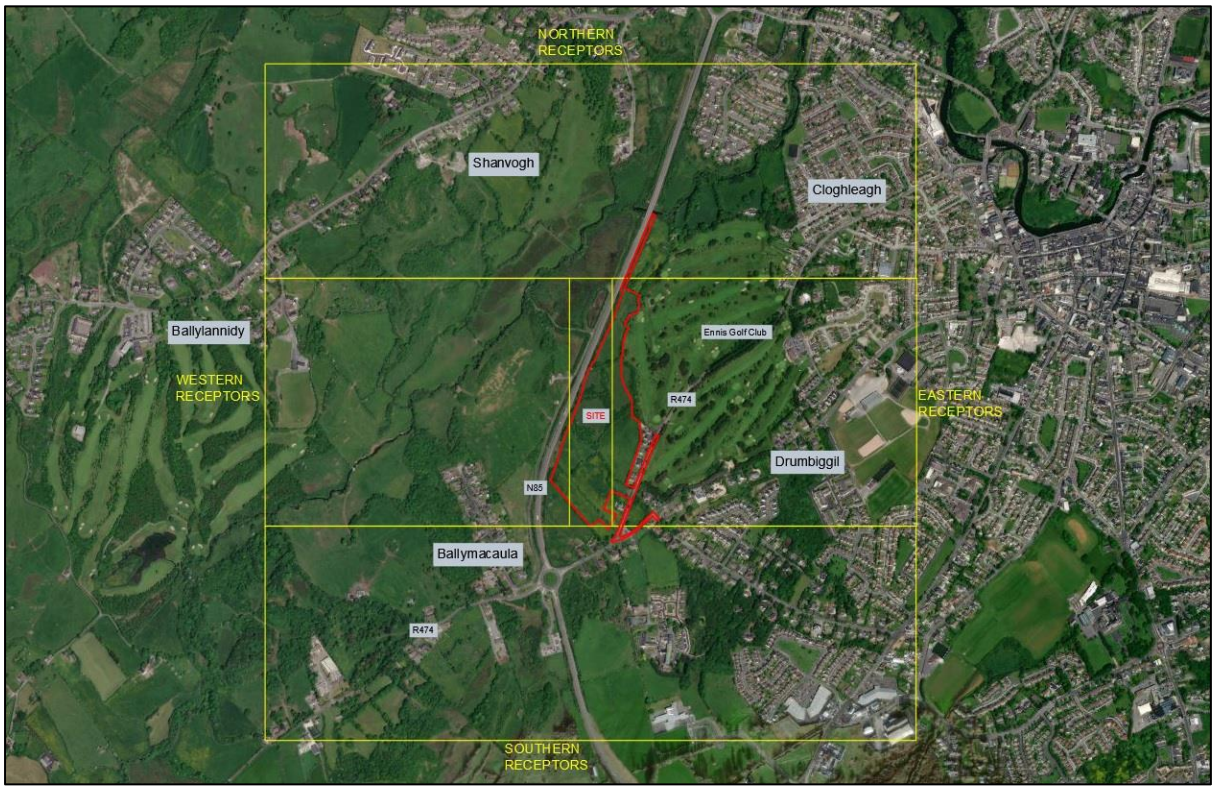

Figure 4.8: Ennis SHD, Receptors (Microsoft Maps)

ROADS – The N85 road which passes to the west of the site is in a cutting close to the site but is visible from the site where it passes over the Claureen River to the north of the site. The road has significant screen planting along its length and is generally screened from the site but additional planting along with suitable boundary treatments will help screen views of the development from the N85. It is proposed to create 4 no. ramped pedestrian connections with the N85 and these will provide permeability for existing and proposed residents. The R474 is on elevated ground compared to most of the site and the development will be visible from views across the golf course.

TOURIST ROUTES – The Wild Atlantic Way is located along the coast and does not come close to the site.

WALKING ROUTES – The Mid Clare Way follows a route around Ennis but it over 12Kms distant at its nearest point to the site.

4.4 Characteristics of the Proposed Development

The proposed development will consist of the following components:

- The construction of 289 no. residential units comprising a mixture of 3 and 2 bed detached, semi-detached and townhouse/terraced units and 24 no. 1 bed apartments/duplex units:
- A 60 no. creche/childcare facility.
- The provision of landscaping and amenity areas.
- All associated infrastructure and services including 1 no. vehicular access point, roads, parking, lighting and drainage
- All associated ancillary development works.

4.5 Potential Impacts of the Proposed Development

The site is located in an area of typical drumlin landscape with frequent hills and valleys with associated rivers and wetlands. There is potential for the development to be visible from a distance as parts of the site are on elevated ground and adjoining a busy N85 National Road to the west and

the site is visible from a busy regional road R474 to the east. Some existing residential developments adjoining the site are visually prominent due to their location and the hilly nature of the landscape. There is a considerable amount of screening on site from the mature hedgerows within and around the perimeter of the site but as the majority of the internal site hedgerows are to be removed as part of the development plans, it will open the site up to views from a range of directions. It is proposed to retain some stretches of existing hedgerow and incorporate these into landscape open space areas. Additional significant native species tree planting will be undertaken (See Doyle O'Troithigh Planting Plans which form part of the planning submission) to mitigate the potential loss of trees and hedgerows.

4.6 Mitigation Measures

The mitigation proposals commenced at the design stage under the following headings: -

4.6.1 Design Stage

There are a number of measures that can and have been taken to ensure that the impacts of the proposed development on the surrounding area are minimised during construction and subsequent commission.

- Retention of sections of hedgerow within the site and the provision of suitable supplemental native species planting to incorporate the hedgerows into the landscape design of the scheme.
- The provision of a public footpath at the western edge linking with the existing Ballymacaula View development. This will provide pedestrian connectivity between the site and the wider area.
- planting of semi-mature trees and ornamental planting, with many flowering varieties which are beneficial for pollinators.
- planting diverse meadow mixes, including naturalised bulb planting and managing key grass areas zones as meadows where possible.
- The provision of a landscaped attenuation area with the emphasis on the provision of a biodiverse area to compensate for the loss of existing ecology.

4.6.2 Construction Stage

This mitigation process was developed to address any residual adverse effects of the development.

- The protection of existing retained trees and screening vegetation on the boundaries to BS 5837:2012 standards with the Root Protection Area (RPA) protected by secure fencing for the duration of the development.
- Soil stripping and correct stockpiling method will ensure that where existing topsoil is to be reused it is stripped and stored in dry conditions and placed in a suitable area of the site where it is not trafficked or contaminated with building spoil.
- Site works are carried out in consideration of neighbouring houses and roadways are and site warning signage are properly maintained.
- Planting operations are carried out to the best horticultural practices and an irrigation and weed control maintenance operations are put in place during the defects liability period.

Figure 4.9: Ennis SHD: -Landscape Masterplans – (DOT LA)

4.6.3 Operational Stage

Grass cutting, tree, shrub and hedge maintenance and leaf and litter clearing are the main operations carried out in such a development. Periodic tree surveys are also important where there are existing mature trees retained on site to ensure the safety of residents and public where trees adjoining housing and roadways.

4.7 Predicted Impacts of the Proposed Development

The impacts on the landscape initially will be the erection of hoarding and the installation of a site compound followed by removal of sections of existing hedgerows and the excavation of rock and topsoil. The visual impacts of the proposed development can be divided into short term construction impacts and operational impacts. The site clearance and level reduction works will have the most negative visual impacts on the houses adjoining the site.

4.7.1 Construction Phase Impacts

Consideration shall be made to mitigate any potentially adverse construction related impacts on the surrounding lands. The normal operations at construction phase would include the erection of visually sensitive site hoarding, site excavation and service connection trenches followed by a period of construction activity.

The operation of a well-managed organised and planned construction site following a specific Construction Management Plan, with adequate control of construction traffic and working activity, will be key to avoiding and or minimising impact. Other control measures will include:

- Adequate measures to protect the existing vegetation and retained features on site and on neighbouring lands.
- Warning signage as per the Traffic Management Plan.
- Use of hoarding for screening works as appropriate.
- Ensure all construction operations are carried out during daylight hours but where site lighting is required it will be directed away from adjoining roadways and dwellings.

4.7.2 Operational Stage Impacts

Once completed the development should integrate visually with the existing landscape and the newly planted trees and shrubs should develop and anchor the development in its surrounds.

Once established the proposed planting should provide additional screening of the new development. The existing trees and retained vegetation on site would be maintained subject to the relevant Wildlife Acts and subject to BS 5387: 2012 Standards. A selection of sections (included with the Doyle O'Troithigh landscape drawings submission) through the site shows the relationship of the development with adjoining properties and the N85 roadway. Section A-A shows the dwelling and terraced pathway with planting adjoining the N85. Section B-B describes the relationship between the site and the housing at Ballymacaula View. Section H-H on the eastern side of the site showing the relationship with the housing on Circular Road and the development.

4.7.3 Photomontage Analysis

A set of 10 no. photomontages have been prepared surrounding the site to fully illustrate the visual nature of the proposed development. The views were taken in the autumn 2021 when deciduous leaf growth was diminishing, with a certain level of screening afforded from deciduous trees. The views have been prepared from publicly accessible locations that are representative of views of the site from the surrounding areas. These photomontages together with a site location map are presented in Appendix 1 (See also the GNet3D photomontage submission with this application for full sized photomontage images). For each of the views taken a Photomontage has been prepared illustrating the development within the defined view. Since the whole or parts of the development will not be visible from some of the viewpoints, red lines are used to indicate the relative positions of the proposed site buildings.

Table 4.2: Photoview Locations, Ballymacaula, Ennis, Co. Clare

View	Description	Location
1	View southwest from R474, Drumbiggle.	Northeast
2	View southwest from R474	Northeast
3	View southwest from R474	Northeast
4	View northwest from R474	Southeast
5	View Northeast from Ballymacaula View Estate	Southwest
6	View northeast from N85	Southwest
7	View northeast from Beechpark Estate, Ballymacaula	Southwest
8	View southeast from N85	Northwest
9	View south from N85	North
10	View southeast from Killnacally	Northwest

Figure 4.10: Ennis SHD, – 10 Photomontage locations (Microsoft Image)- See also GNET3D Submission.

Photomontage View 1: View southwest from R474, Drumbiggle.	
Existing View The low boundary on the R474 at this point allows clear views southwest over the golf course and to the countryside beyond. The site is partially obscured by intervening vegetation but the houses on the elevated ground at Beechpark are partially visible in the distance.	
Proposed View The proposed development approximately 500m distant visually integrates with the housing at Beechpark and is set into the landscape without breaking the horizon. The existing vegetation provides screening for the development in this viewpoint.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 2: View southwest from R474	
Existing View The view is across the golf course with the site to the rear of the golf course boundary hedgerow. There are views of the distant countryside to the southwest.	
Proposed View The site is approximately 100M distant from this viewpoint. The development, being set at a lower level to the roadway, results in only the roofs of the proposed houses being visible with intervening trees screening views of the development. The development does not negatively impact on the views of the elevated countryside to the southwest.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 3: View southwest from R474	
Existing View The site is generally screened from this view by existing dense vegetation but some of the houses at Beechpark are visible as is the countryside beyond. The house on the left backs out onto the site.	
Proposed View This view approximately 50M from the site shows partial views of the rear of some of the houses but the low elevation of the site and existing vegetation effectively screens views of the proposed development. The construction stage would be visually negative in the short term. Section H-H as contained in the Doyle O'Troithigh Drawing LS-02-PP shows the relationship of the existing residential development with the proposed in terms of height.	
Impact (Construction Stage)	Moderate negative short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 4: View northwest from R474	
Existing View The view is from in front of a group of houses on the R474 which face out towards the site. The site lands rise up from the road with the site hedgerows visible at the edge of the fields.	
Proposed View The view towards the site shows the rear elevation of the closest houses which are separated from the roadway by adjoining lands. The possibility of introducing mitigating screen planting is diminished by the private rear garden areas and intervening adjoining non site lands. However, the proposed development would be visually linking with the existing urban form surrounding this road junction.	
Impact (Construction Stage)	Moderate negative short term visual impact
Impact (Operation Stage)	Slight negative long term visual impact.

Photomontage View 5: View Northeast from Ballymacaula View Estate	
Existing View This is a new housing development which backs out onto the site lands. There will be a pedestrian connection from this area into the site. The site vegetation and the trees from the golf course are visible between the houses.	
Proposed View There are glimpse views of the proposed development between the existing houses and proposed tree planting along the pedestrian link path helps soften the visual impact of the proposed development.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 6: View northeast from N85	
Existing View This view from the N85 shows the planted embankment to the side of the road and the Ballymacaula View houses are visible at the top of the bank partially screened by the developing roadside planting.	
Proposed View The proposed development is only partially visible at the roof level as indicated by the red line. The development would visually link with the existing development at Ballymacaula View.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 7: View northeast from Beechpark Estate, Ballymacaula	
Existing View The houses in this estate are visible from the site as they are located on land that rises to above the 40M contour. The view shows the countryside and housing estates to the northeast including the vegetation on the site lands.	
Proposed View The proposed housing along the western flank of the development bounding the N85 is visible in the distance between the Beechpark houses. The proposed development sits into the existing landscape and while visible, the proposed development would be seen as an extension of existing housing in the area. Proposed tree planting would further visually integrate the development into its surrounds over time.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 8: View southeast from N85	
Existing View The N85 road is in a cutting in this area and the land rises steeply towards the site. The existing rough landscape finish at the edge of the road accentuates the remote quality of the roadway.	
Proposed View The proposals show the housing units set in an attractively landscaped setting with the pedestrian access path bringing animation to the existing isolated roadside. The short-term construction stage would be the most visually negative, but site hoarding would mitigate this impact. The finished project would visually enhance this section of roadway and provide additional safe pedestrian access for existing and proposed residents.	
Impact (Construction Stage)	Moderate negative short term visual impact
Impact (Operation Stage)	Neutral to positive long term visual impact.

Photomontage View 9: View south from N85	
Existing View The N85 road at this location is visible from the site as it rises to cross the Claureen River. The view towards the site, approximately 350m in the distance, includes significant tree cover in the area. The existing Beechpark housing is visible on the right.	
Proposed View The roof level of the development is partially visible in this view with existing vegetation providing a screen for the buildings. Proposed tree planting within the development visually links the development with its surrounds.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

Photomontage View 10: View southeast from Killnacally	
Existing View Views west from site include the Killnacally area with scattered housing visible. The high ground at Beechpark partially screens the site from this viewpoint.	
Proposed View The development, while visible, is well set in the landscape with sections of the golf course to the rear visible above the development. The proposed tree planting in the development will further integrate the development into its surrounds over time.	
Impact (Construction Stage)	Slight negative visual impact short term visual impact
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

4.8 Residual Impacts

The residual impacts of this proposed development will be associated with the introduction of a concentrated housing development into hilly rough agricultural lands with existing housing developments and passing roads. Existing residences close to the site that formerly had views of agricultural land will have a residential development as part of their aspect. The site sections as prepared by Doyle O'Troithigh namely LS-01, LS-02 and LS-03 show the relationship of the existing residential development and the N85. The proposed development will create an attractive landscaped vista to the N85 replacing the existing secluded feeling of the roadway.

The proposed development lands have been zoned as residential and comply with the density requirements as set out in the Clare Co. Development Plan. The development has been designed with the CDP Objectives relating to development with respect to the retention of Woodland, Trees and Hedgerows which was set out in conjunction with the project Ecologist. The proposed replacement tree planting numbers is also in line with the recommendations in the County Development Plan. The development also complies with the Landscape Character Area being in a Working Landscape and the proposed siting of the development close to existing residential areas. The County Clare Development Plan references a number of Views and Prospects to be protected and the development does not conflict with any of the listed views. While it is inevitable that the development will be visible to existing residents and road users, the nature of the generally low-lying site, the design and layout of the buildings and the proposed extensive landscape planting helps create a setting for the development that will be acceptable from a landscape and visual perspective.

4.9 References

- 'Guidelines on the Information to be contained in Environmental Impact Statements', Environmental Protection Agency, 2002 and Draft Guidelines 2017.
- 'Advice Notes on Current Practice in the preparation of Environmental Impact Statements', Environmental Protection Agency, 2003.
- 'Guidelines for Landscape and Visual Assessment', 3rd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- Urban Development & Building Heights, Dept. of Housing Planning & Local Government 2018

4.10 Appendix 1 Proposed Views – See GNET3D submission for final Photomontage locations and existing and proposed views.

Table - Appendix 1: Photoview Locations, Ennis SHD

View		Description	Location
1		**View southwest from R474, Drumbiggle.**	Northeast
2		**View southwest from R474**	Northeast
3		**View southwest from R474**	Northeast
4		**View northwest from R474**	Southeast
5		**View Northeast from Ballymacaula View Estate**	Southwest
6		**View northeast from N85**	Southwest
7		**View northeast from Beechpark Estate, Ballymacaula**	Southwest
8		**View southeast from N85**	Northwest
9		**View south from N85**	North
10		**View southeast from Killnacally**	Northwest

Figure Appendix 1 – Ennis SHD – 10 No. Photomontage Locations (Bing Maps) – See also GNET3D submission with full sized views

View 01 – Existing – View West from R474 over Golf Course

View 01 – Proposed – View West from R474 over Golf Course

View 02 –Existing- View West over Golf Course from R474

View 02 –Proposed - View West over Golf Course from R474

View 03 – Existing – View West over Golf Course from R474

View 03 – Proposed – View West over Golf Course from R474

View 04 – Existing – View Northwest from R474

View 04 – Proposed – View Northwest from R474

View 5 – Existing – View Northeast from Ballymacaula View

View 5 – Proposed – View Northeast from Ballymacaula View

View 06 – Existing – View Northeast from N85

View 06 – Proposed – View Northeast from N85

View 7 – Existing - View East from Beechpark

View 7 – Proposed - View East from Beechpark

View 08 – Existing - View south from N85

View 08 – Proposed - View south from N85

View 09 –Existing - View south from N85 at Claureen River Bridge

View 09 –Proposed - View south from N85 at Claureen River Bridge

View 10 – Existing - View southeast from Kilncally

View 10 – Proposed - View southeast from Kilncally

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

CHAPTER 5

Material Assets: Traffic and Transportation

August 2022

Glenveagh
Home of the new.

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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5 Material Assets: Traffic and Transportation

5.1 Introduction

This chapter describes the material assets from a traffic and transport perspectives that could potentially be impacted by the Proposed Project.

The purpose of this Traffic and Transport EIAR Section is to assess the potential impact of the proposed Strategic Housing Development at Circular Road, Ennis, Co. Clare on the existing local transport network and to review whether the proposed site access (and the existing junctions which fall within the scope of the study) will have adequate capacity to carry the development traffic and the future growth in existing road traffic to the design year and beyond and to also identify possible mitigation measures to reduce traffic impacts. An assessment of the accessibility of the site for cyclists, pedestrians and public transport users has also been made.

This section is written as a concise summary of the Traffic and Transport Statement, included as Appendix 5.1 of this EIAR. Rather than repeat the detailed traffic assessments carried out within this Traffic and Transport Statement, it is referred to throughout this chapter, with the impact assessment findings discussed below.

5.1.1 Author Information and Competency

This EIAR Section was written by Micheál Geraghty of Tobin Consulting Engineers. TOBIN Consulting Engineers are in operation for over 60 years and have carried out numerous Traffic and Transportation Assessments (TTA's) for various residential, commercial, business, retail and leisure developments. TOBIN has also Traffic Chapters for a number of EIAR's for various project types. The drafting of TTAs and Traffic Chapters involve the followings tasks:

- Liaising with Local Authorities, TII, clients and other key stakeholders,
- Analysis of the suitability of haul routes,
- Design and analysis of access points to all types of developments,
- Access and site layout arrangements using AutoTRACK, swept path analysis software,
- Junction analysis on uncontrolled, signalised and roundabout junctions

5.2 Methodology

The approach to the assessment of likely significant impacts on traffic and transportation in this chapter accords with policy and guidance at National, Regional and Local level. The methodology responds to best practices, current and emerging guidance, all of which advocate this method of analysis. Key publications consulted include:

- Environmental Protection Agency (EPA) Guidelines on the information to be contained in the EIAR (2022);
- NRA 'Traffic and Transport Assessment Guidelines' (May 2014);
- NRA Project Appraisal Guidelines for National Roads Unit 5.3: Travel Demand Projections;
- Design Manual for Urban Roads and Streets;
- Clare County Development Plan 2017-2013;
- Draft Clare County Development Plan 2023-2029;

A Traffic and Transport Assessment (TTA) has been prepared in accordance with the NRA's 2014 publication 'Traffic and Transport Assessment Guidelines' and the 'Guidelines for Traffic Impact Assessments' as published by the Institution of Highways and Transportation U.K in 1994 and is included in Appendix 5.1. The scope and extent of the TTA was discussed and agreed with Clare County Council (as outlined further in Section 5.3.2) and also considered a no. of relevant points and recommendations issued by Transport Infrastructure Ireland (TII) in response to an EIAR scoping request.

Key parameters relating to the traffic modelling carried out included: junctions to be assessed, trip generation, modal shift targets, trip distribution and assessment years. The traffic and transport impact of the proposed development is discussed as part of the assessment. The traffic and transport significance levels and criteria definitions are outlined in the Table below.

Table 5.1: Significance Criteria for Impacts on Traffic or Transportation

Significance Level	Criteria
Profound	Profound impacts occurs where there is permanent disruption to transport network.
Significant	Significant impact occurs where there is sever disruption to traffic and/or transport
Moderate	Moderate impact occurs where there is medium term disruption to the network or significant increase of traffic flow
Slight	Slight impact occurs where there is noticeable description or an increase in wait times
Imperceptible	Imperceptible impact occurs where there is temporary distribution or no quantifiable increase in traffic.

5.2.1 Consultation/Scoping

Tobin Consulting Engineers contacted Clare County Council's Roads Department in relation to the proposed development in November 2021. Clare County Council requested that analysis be carried out at the following junctions:

- Junction 1: Roundabout Junction (Beechpark) N85 / R474
- Junction 2: Priority Junction R474 / Drumbiggle Road
- Junction 3: Roundabout Junction R474 / Cloughleigh Rd / Davitt Terrace
- Junction 4: Priority Junction R474 / R458
- Junction 5: Priority Junction Proposed Access / R474

Figure 5.1: Junction locations

The outcomes of this exercise were incorporated into the Traffic and Transport Assessment and design drawings. The scheme design and access options were also reviewed and discussed at the Stage 1 meeting held between Clare County Council and the Client / Design Team in October 2021 and further at the Stage 2 Tripartite meeting held between An Bord Pleanála, Clare County Council and the Client / Design Team in April 2022. The resulting comments were taken on board and amendments to the design were incorporated where possible.

As part of the EIAR scoping exercise, a EIAR scoping request was also sent to TII. The response identified a number of items relating to the roads / civils aspects of the proposed development. The recommendations of the letter have been addressed within the application as follows:

1. Consultations have been completed with the relevant Local Authority
2. A Traffic and Transport Assessment was carried out for the proposed development
3. A Road Safety Audit was completed on the proposed road design element for the project
4. The roads and junctions have been designed to the relevant standards.
5. No surface water generated on the proposed development site will be discharged to any national roads drainage structure.

5.2.2 Traffic Counts

In order to determine the magnitude of the existing traffic flows, the results of a manual classified junction turning counts was used. The traffic surveys were carried out by Traffinomics Limited. The junction count was undertaken on Tuesday 9th November 2021 between the hours 07:00 and 19:00. The count information was obtained on the following locations:

- Junction 1: Roundabout Junction (Beechpark) N85 / R474
- Junction 2: Priority Junction R474 / Drumbiggle Road
- Junction 3: Roundabout Junction R474 / Cloughleigh Rd / Davitt Terrace
- Junction 4: Priority Junction R474 / R458

This survey distinguished between light good vehicles and heavy good vehicles. The results of this survey indicated that the peak traffic levels through the junction occurred between the hours of 08:30 and 09:30 and between 17:00 and 18:00.

5.3 Difficulties Encountered

There were no difficulties encountered preparing this chapter.

5.4 Existing Receiving Environment

5.4.1 Location and Network Summary

Land Use

The site is located approximately 1.6km west of Ennis Town Centre and is an existing 11.32 ha greenfield site at Drumbiggle, Ennis, Co. Clare. Site access is proposed via a new access junction onto the R474 Circular Road. The site was previously granted conditional planning permission (Planning Ref: 18/811) for 99 no. of residential units which is discussed further in chapter 2 and chapter 3 of this EIAR.

Existing Road Network

The layout of the local road network is presented in the Figure below. The proposed development is bounded to the West by the N85 Road, and to the South and East by the R474 Circular Road.

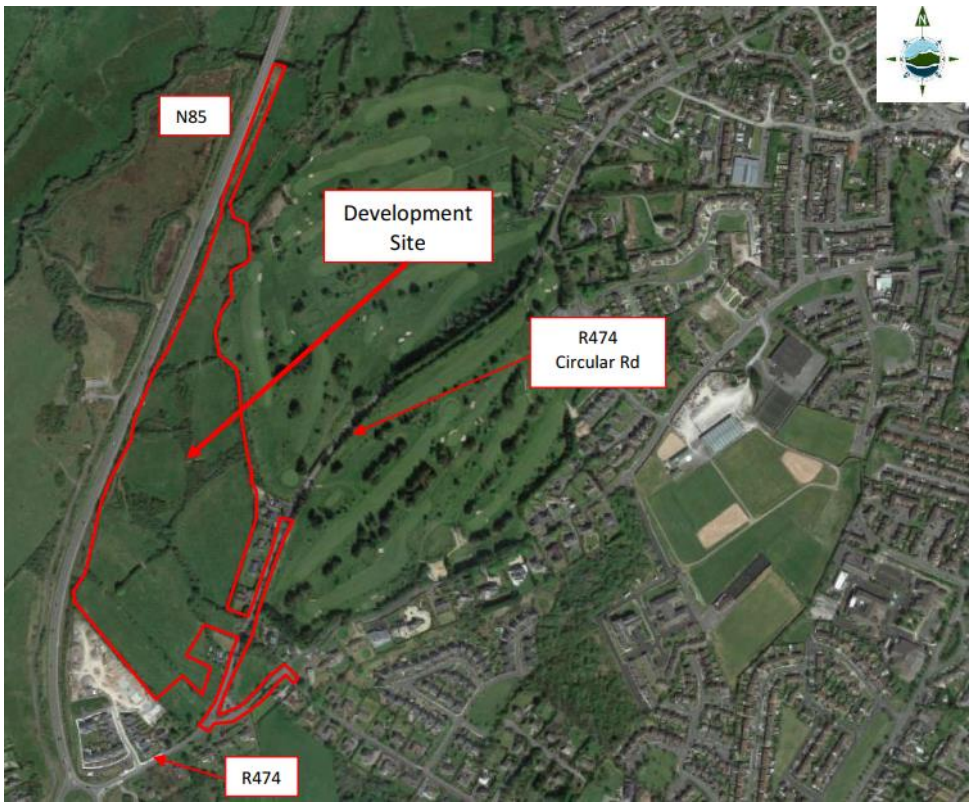

Figure 5.2: Site location and surrounding road network

A brief description of the local road network and associated junctions is provided as follows:

N85 National Road

The N85 National Road is a single carriageway road (one lane in each direction) with a hard shoulder on both sides of the road. The N85 Road forms part of the Ennis outer ring road and connects to the M18. The N85 connects to the R474 Circular Road via a roundabout junction. A pedestrian footway is provided along the eastern side of this road which connects to pedestrian infrastructure located to the east and onwards into Ennis town centre.

R474 Circular Road

The R474 Circular Road is a single carriageway road with one lane in each direction. The R474 Circular Road connects to the N85 National Road at its south-western end and with Ennis Town Centre at its north-eastern end. Both junctions are roundabout junctions.

The walking network in Ennis is comprised of existing footpaths adjoining public roads. The main approaches to the town have footpaths for pedestrian use only. There is no dedicated cycling network within the centre of the town and cyclists utilise the existing roadway.

There is a pedestrian footway provided along the northern side R474 Circular Road which connects to the proposed development with pedestrian infrastructure to the east (Ennis town centre).

Public Transport

Ennis town is served by a number of regional and local bus routes. Local Link operates two local bus routes to Kilrush, Bus Eireann operates a number of local and regional bus routes to Shannon, Limerick, Lahinch, Kilkee, Scariff, Galway and Cork City. Dublin coach also operate bus services to Dublin.

Ennis town is also served by a number of train services which is located approximately 2.7km from the proposed development. Iarnród Eireann operate a number of services from this station of which include Dublin Heuston – Limerick, Galway -Limerick and Waterford – Clonmel – Limerick Junction.

Future Transportation Environment

The possibility of the extension of the current local link bus route to serve the proposed development can be considered. Clare County Council are currently reviewing the cycling infrastructure in the vicinity of the site and are working on proposals for the upgrading of same. Additional pedestrian linkages into Ennis town are also being proposed as part of the overall development proposals.

5.5 Proposed Development

The proposed development will consist of 289 residential units and a childcare facility, and a full description of the development can be found in Chapter 2 of the EIAR. The development will deliver a residential neighbourhood within proximity of Ennis Town Centre. The site will have direct vehicle access to the R474 Circular Road.

Site access of the proposed development will be gained through a new priority T-junction onto the R474 circular road. The new priority junction will tie into the existing pedestrian footpath located along the northern side of the R474 circular road, which provides pedestrians with a direct linkage to Ennis town. The proposed development will be constructed in 3 no. phases as outlined in section 5.6.4 of this chapter. The internal roads and footpath layouts of the development has been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS)

5.5.1 Parking Provision

The maximum parking provisions at the site have been calculated in accordance with the parking Guidelines set out in the following:

- Clare County Council Development Plan (CCCDP) 2017- 2023

The required and provided car parking breakdown for the proposed development (289 units) is illustrated in Table 5.1 below.

Table 5.1: Car Parking Requirements

Car Parking	CCCDP	No of Units / Staff and Children	Required	Parking Provided
1 & 2 bed houses and apartments	A 1.9.3 – 1 Space Per Unit	90	90	508
≥3 bed houses	A 1.9.3 – 2 Spaces Per Unit	199	398	
Creche (60-child capacity)	A 1.9.3 – 1 per employee and 1 per 4 children	5 / 60	20	11
Totals	-		**508**	**519**

A total of 519 no. car parking spaces will be provided onsite, of which include 4 no. disabled spaces and 10 no. of electric charging parking spaces and 16 no. visitor parking spaces. There are also 2 no. motorcycle parking spaces provided for at the creche.

5.5.2 Road Safety Audit

A road safety audit has been carried out by CST Group Chartered Consulting Engineers independently from the design team on the proposed development. The Audit identified a number of items which were reviewed by the Design Team and the design amended where necessary. The recommended measures and proposals were agreed and signed off by the Designers, Client and Auditors. The final site layout provides a roads network throughout the development which incorporates measures (such as curved alignments, surface materials to differentiate pedestrian and vehicle routes etc.) that ultimately provide a high level of safety for both the pedestrian and the driver without comprising the overall quality of the development. Swept path analysis has also been carried out to ensure vehicles can manoeuvre safely within the site.

Please refer to the CST Road Safety Audit included as part of this application for further details.

5.5.3 Existing Traffic Flows on the Local Network and the Traffic Impact of the Proposed Development

In the absence of any specific local traffic growth information, it was assumed that baseline traffic will continue to grow at the levels recommended by TII in the Project Appraisal Guidelines (PAG) – Unit 5.3 'Travel Demand Projections' publication (PE-PAG-02017) – latest revision dated October 2021. The Project Appraisal Guidelines describe three levels of transport model functionality. The simple model, which reflects traffic volumes on the basis of link flows, is best suited to the proposed development. Such models do not attempt any route assignment, and hence are applicable for networks where no change in traffic flows will result from a proposed scheme. Growth rates recommended in PAG – Unit 5.3 have been used to determine future traffic flows on the road network within the vicinity of the development. Growth Rates for County Clare were used in the analysis.

The year of opening of the scheme was assumed to be 2024. The central growth factors from the Project Appraisal Guidelines – Unit 5.3 publication were used and are detailed below: -

- TII Link Based Growth Rates: Annual Growth Factor for 2016-2030 = 1.0156 (LVs) and 1.0417 (HVs);
- TII Link Based Growth Rates: Annual Growth Factor for 2030-2040 = 1.0038 (LVs) and 1.0157 (HVs).

The annual growth factors for Light Vehicles (LVs) and Heavy Vehicles (HV) were applied to surveyed values of vehicles counted.

With regards to the volume of traffic using the road, the passenger car is adopted as the standard unit and other vehicles are assessed in terms of PCU's. Cars and Light Goods Vehicles are grouped together as Light Vehicles (LV). All other Goods Vehicles, Buses and Coaches are defined as Heavy Vehicles (HV).

The classification of vehicles in PCU's is shown below:

Table 5.2: Classification of Passenger car Units

Vehicle	PCU
Car	1
Light Goods Vehicle	1
Other Goods Vehicle (2 -3 axle)	1.5
Other Goods Vehicle (4 -5 axle)	2.3
Bus	2
Cycle	0.4

The C.S.O. Travel Census data for Ennis was obtained for the 2016 census under the section E6013: Population Usually Resident and Present in the State 2016 by Sex, Means of Travel, Towns by Size, At Work School or College and Census Year. This data is presented in the Figure below. The data excludes the census data for the 'not stated' as these are not applicable for the analysis – the figures below are adjusted accordingly.

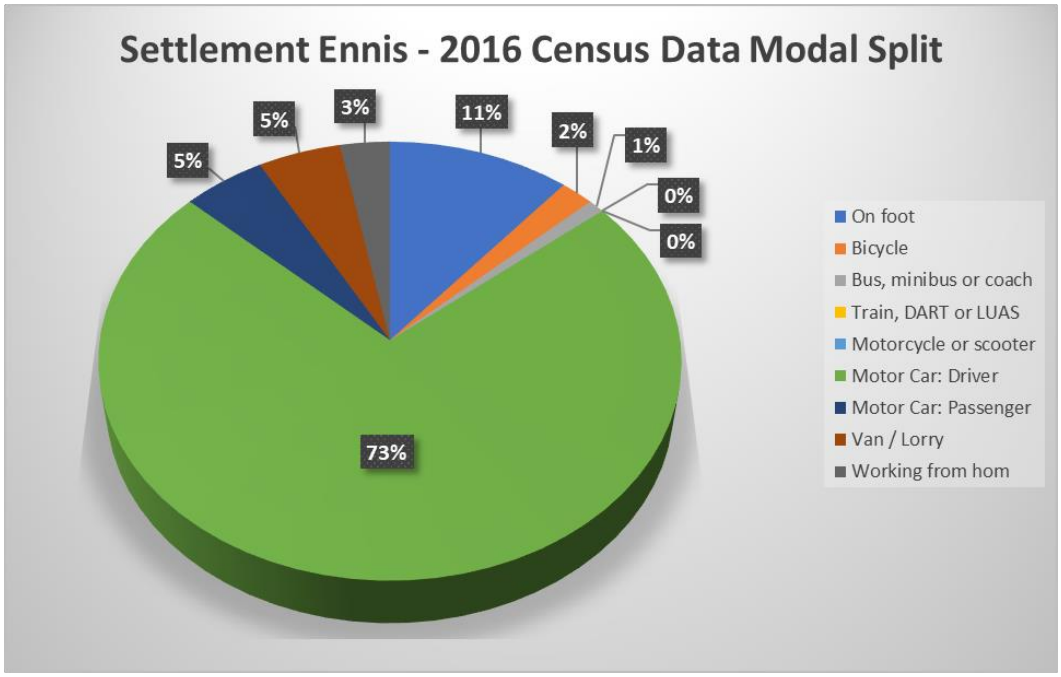

Figure 5.3: Ennis Settlement Zone Commuter Trips - Modal Split (2016 Census)

One of the main objectives for the site will be to reduce the number of car trips and in cases where there is no other option but to travel by car, to increase the number of people carpooling and travelling as passengers.

5.6 Potential Impact of the Proposed Development

The following section outlines the Traffic and Transportation Assessment undertaken in accordance with the TII Traffic and Transportation Assessment Guidelines – August 2014 publication (PE-PDV-02045).

The predicted impact, the mitigation measure required, and the residual impacts are considered under the following headings:

- Do Nothing Scenario
- Construction Phase
- Operational Phase
- Cumulative Impacts

The proposed development will impact on the surrounding roads network during construction and operational stages. It is broadly accepted that operational stage traffic will exceed that of construction stage traffic and will be potentially less manageable in terms of avoiding peak hour traffic periods. Therefore, traffic models of the proposed development access junctions as well as the existing Junctions 1, 2, 3 and 4 have been developed with operational phase traffic presenting a worst-case scenario.

5.6.1 Assessment Periods

5.6.1.1 Assessment Year

TII Traffic and Transportation Assessment Guidelines sets out the required assessment years and time periods to be assessed. In accordance with this guideline document, the following sections detail those proposed in this assessment.

5.6.1.2 Construction Phase

The assessment years typically include for the construction phase and operational phase. It is broadly accepted that the operation stage traffic will exceed the construction stage traffic hence no Construction Phase has been assessed.

5.6.1.3 Operational Phase

For this application, the Operational Phases as per TII Traffic and Transportation Assessment Guidelines (PE-PAV-02045) are:

- Operational Phase
    - 2024 – Envisaged Year of Opening;
    - 2029 – Year of Opening plus 5 years;
    - 2039 – Year of Opening plus 15 years.

5.6.2 Traffic Growth

Annual growth indices were updated in 2019 by the TII, with annual indices and cumulative growth forecasts shown for Clare in the Table below. The derived growth factors were applied to 2021 flows to determine background traffic flows for the assessment years. The assessment is split into light vehicles and heavy vehicles. These growth factors were applied to the traffic volumes measured during the traffic survey.

Table 5.3: Growth Factors for light vehicles (LV) and heavy vehicles (HV)

	2024	2029	2039
LV	1.048	1.132	1.189
HV	1.130	1.387	1.662

5.6.3 Do Nothing Scenario

It shall be noted that the Do-Nothing scenario is equivalent to the baseline environment. The assessment of the existing environment/Do Nothing Scenario, would be a scenario where there is no change to the environment. (i.e., if the development does not proceed).

5.6.3.1 Baseline Traffic

Traffic count data have been utilised in accordance with the Transport Infrastructure Irelands (TII) Project Appraisal Guidelines (PAG) - Unit 16 in order to estimate the Annual Average Daily Traffic (AADT) two-way traffic flow on the associated road network. This method is an industry standard as it takes account of seasonal variations that is typically experienced during national public holidays and tourist seasons. In turn, this allows for an informed and representative basis for comparison of project related impacts.

5.6.4 Construction Phase

Construction traffic travelling to the proposed development site will use the N85 Road and R474 Circular Road. A Traffic Management Plan (which will be completed by the Contractor appointed to the project) for the construction stage will identify haulage routes and restrictions as appropriate in discussion with the Local Authority. A draft Construction Traffic Management Plan is included with the planning application which outlines the preliminary management plan and what will be expected of the Main Contractor's Management Plan at construction stage.

It is estimated a total of 920 no. HGV delivery trips will be generated during the total construction stage of the development. It is also envisaged that during the busiest period onsite, namely the groundworks element of the works, an estimated 12 no. HGV's will deliver to the site on a daily basis for the duration of this work element. HGV deliveries are envisaged at other periods during the construction phase but these are expected to be at a lower frequency. It is estimated that for a development of this size, 60 – 70 site operatives will be employed at the height of the construction works. This would equate to an approx. 60 PCU vehicle (Vans and Cars) trips to and from the site during the construction days.

The increase in traffic volumes, as a result of construction vehicles visiting the site, is not considered to be excessive and will be spread out over a three-year period over the three phases of the development. The development has also been designed to minimize cut and fill throughout the site, in keeping the proposed finish floor levels of the units and the proposed road levels as close to the existing ground levels as possible. As a result the trip generation associated with the exporting and importing of cut and fill material to site is minimised. For further detail on the cut and fill, please refer to chapter 7 Soils Chapter of this EIAR.

Due to the designated access point off the R474 Circular Road, allowing delivery vehicles to pull off the road into the site, there will be no significant disruption on the traffic flows on the R474 Circular Road as a result of the construction of the development. It is recommended that all delivery drivers and haulage companies serving the proposed development are provided with instructions / directions on accessing the site from the R474 Circular Road and the surrounding local road network. Overall, there will be a short-term imperceptible negative impact to local traffic during the construction phase.

5.6.5 Operational Phase

The Operational Phase of the development has the largest impact. Tobin Consulting Engineers have procured Trip Rate Information Computer System (TRICS) data for similar sized residential developments in order to inform the trip rate associated with such a development. The estimated total number of vehicular trips generated by the proposed development is shown in the Table below which details the generated traffic for the AM and PM peak hours.

The Table demonstrates the expected AM/PM traffic generation figures from the various uses of the scheme and a total of 180 trip movements in the AM peak and a total of 143 trip movements in the PM peak are expected to result from the proposed development.

A total of 31 AM peak trips and 6 PM peak trips are allocated to the creche element of the development. Once the development is fully operational, it is expected that this is an over exaggeration of creche related trips. It is estimated that creche trips will predominately be self-contained within the development, with most of the creche users walking from within the development site. The creche trip rate shown in the table has been implemented in the design for a more conservative traffic analysis.

It was envisaged the proposed development trip distribution matches the existing traffic distribution observed during the traffic surveys conducted at each of the junctions.

Table 5.4: Traffic Generation

	Residential Units / GFA	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Proposed Mixed Residential Apartments & Houses (TRICS)	289 units	55	93	92	45
Proposed Creche (TRICS)	340 GFA	19	12	3	3
Total		**74**	**106**	**95**	**48**

The JUNCTION 10 (PICADY) assessment of each junction illustrated below. A complete set of outputs from JUNCTION 10 are included in Appendix 5.1 of this EIAR report.

Table 5.5: Junction 1 - Existing Roundabout Junction

	AM					PM				
	Set ID	**Queue (PCU)**	**Delay (s)**	**RFC**	**LOS**	**Set ID**	**Queue (PCU)**	**Delay (s)**	**RFC**	**LOS**
	2021 Baseflow									
Arm 1	D1	2.1	10.40	0.68	B	D2	0.4	4.11	0.30	A
Arm 2		0.3	4.39	0.21	A		0.4	4.24	0.30	A
Arm 3		0.6	4.05	0.37	A		1.3	6.07	0.56	A
Arm 4		0.6	5.51	0.39	A		0.3	4.73	0.22	A
	2024 Baseflow									
Arm 1	D3	2.1	9.85	0.68	A	D4	0.5	4.24	0.32	A
Arm 2		0.3	4.56	0.22	A		0.5	4.40	0.32	A
Arm 3		0.7	4.27	0.39	A		1.5	6.60	0.59	A
Arm 4		0.7	5.81	0.41	A		0.3	4.93	0.24	A
	2024 Baseflow + Dev									
Arm 1	D5	2.3	10.57	0.69	B	D6	0.5	4.46	0.34	A
Arm 2		0.4	4.94	0.28	A		0.5	4.60	0.35	A
Arm 3		0.7	4.41	0.40	A		1.7	7.11	0.62	A
Arm 4		0.8	6.13	0.43	A		0.4	5.25	0.28	A
	2039 Baseflow									
Arm 1	D7	2.6	11.96	0.72	B	D8	0.6	4.71	0.37	A
Arm 2		0.4	4.87	0.26	A		0.6	4.95	0.38	A
Arm 3		0.9	4.89	0.46	A		2.3	8.95	0.69	A
Arm 4		1.0	7.06	0.49	A		0.4	5.62	0.30	A
	2039 Baseflow + Dev									
Arm 1	D9	4.9	19.85	0.83	C	D10	0.7	4.99	0.40	A
Arm 2		0.5	5.70	0.34	A		0.7	5.20	0.41	A
Arm 3		1.0	5.08	0.48	A		2.6	9.92	0.72	A
Arm 4		1.1	7.54	0.52	A		0.5	6.05	0.33	A

The summary of performance analysis indicates that during the Operational Phase Junction 1 (existing roundabout junction) will operate with negligible queues and delays pre and post the development during the morning and evening peak hours.

Table 5.6: Junction 2 - Existing Priority Junction

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2021									
Stream B-C	D1	0.2	7.86	0.16	A	D2	0.4	8.32	0.28	A
Stream B-A		0.3	14.23	0.20	B		0.1	13.24	0.13	B
Stream C-AB		1.2	8.94	0.47	A		0.2	6.63	0.16	A
	2024 Baseflow									
Stream B-C	D3	0.2	8.01	0.17	A	D4	0.4	8.58	0.30	A
Stream B-A		0.3	14.80	0.21	B		0.2	13.58	0.14	B
Stream C-AB		1.4	9.36	0.50	A		0.3	6.69	0.17	A
	2024 Baseflow + Dev									
Stream B-C	D5	0.4	9.59	0.26	A	D6	0.6	9.62	0.36	A
Stream B-A		0.5	18.68	0.33	C		0.2	15.50	0.17	C
Stream C-AB		2.0	11.19	0.59	B		0.5	7.68	0.28	A
	2039 Baseflow									
Stream B-C	D7	0.3	8.87	0.22	A	D8	0.7	10.87	0.42	B
Stream B-A		0.4	18.18	0.29	C		0.3	16.72	0.20	C
Stream C-AB		2.5	12.49	0.64	B		0.4	7.10	0.24	A
	2039 Baseflow + Dev									
Stream B-C	D9	0.5	11.34	0.32	B	D10	0.5	9.55	0.35	A
Stream B-A		0.8	24.83	0.43	C		0.2	15.79	0.16	C
Stream C-AB		3.9	17.00	0.74	C		0.5	7.89	0.29	A

The summary of performance analysis indicates that during the Operational Phase Junction 2 (existing priority junction) will operate with negligible queues and delays pre and post the development during the morning and evening peak hours .

Table 5.7: Junction 3 - Existing Roundabout Junction

	AM					PM				
	Set ID	**Queue (PCU)**	**Delay (s)**	**RFC**	**LOS**	**Set ID**	**Queue (PCU)**	**Delay (s)**	**RFC**	**LOS**
	2021 Baseflow									
Arm 1	D1	0.3	2.88	0.21	A	D2	0.1	2.35	0.07	A
Arm 2		0.2	3.51	0.17	A		0.3	3.53	0.24	A
Arm 3		0.1	4.98	0.08	A		0.2	5.88	0.19	A
Arm 4		0.6	6.40	0.36	A		0.4	5.77	0.26	A
	2024 Baseflow									
Arm 1	D3	0.3	2.94	0.23	A	D4	0.1	2.37	0.08	A
Arm 2		0.2	3.58	0.18	A		0.3	3.60	0.26	A
Arm 3		0.1	5.05	0.08	A		0.3	6.05	0.21	A
Arm 4		0.6	6.62	0.38	A		0.4	5.91	0.28	A
	2024 Baseflow + Dev									
Arm 1	D5	0.3	3.10	0.24	A	D6	0.1	2.43	0.08	A
Arm 2		0.3	3.75	0.21	A		0.4	3.89	0.31	A
Arm 3		0.1	5.28	0.09	A		0.3	6.63	0.23	A
Arm 4		0.9	7.83	0.47	A		0.5	6.34	0.32	A
	2039 Baseflow									
Arm 1	D7	0.4	3.17	0.27	A	D8	0.1	2.43	0.09	A
Arm 2		0.3	3.85	0.21	A		0.4	3.82	0.29	A
Arm 3		0.1	5.29	0.10	A		0.3	6.60	0.24	A
Arm 4		0.8	7.44	0.44	A		0.5	6.40	0.32	A
	2039 Baseflow + Dev									
Arm 1	D9	0.4	3.36	0.28	A	D10	0.1	2.49	0.09	A
Arm 2		0.3	4.04	0.24	A		0.5	4.14	0.34	A
Arm 3		0.1	5.53	0.11	A		0.4	7.33	0.27	A
Arm 4		1.2	9.01	0.54	A		0.6	6.92	0.37	A

The summary of performance analysis indicates that during the Operational Phase Junction 3 (existing roundabout junction) will operate with negligible queues and delays pre and post the development during the morning and evening peak hours .

Table 5.8: Junction 4 - Existing Priority Junction

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2021 Baseflow									
Stream B-ACD	D1	0.0	0.00	0.00	A	D2	0.0	11.77	0.02	B
Stream A-BCD		0.5	11.15	0.31	B		1.1	15.95	0.50	C
Stream D-ABC		1.4	15.69	0.57	C		0.5	10.82	0.35	B
Stream C-ABD		0.0	7.36	0.01	A		0.0	8.29	0.01	A
	2024 Baseflow									
Stream B-ACD	D3	0.0	0.00	0.00	A	D4	0.0	12.30	0.02	B
Stream A-BCD		0.5	11.57	0.32	B		1.3	17.13	0.53	C
Stream D-ABC		1.6	17.29	0.61	C		0.6	11.45	0.37	B
Stream C-ABD		0.0	7.45	0.01	A		0.0	8.46	0.01	A
	2024 Baseflow + Dev									
Stream B-ACD	D5	0.0	0.00	0.00	A	D6	0.0	13.06	0.02	B
Stream A-BCD		0.7	12.70	0.38	B		2.0	21.37	0.64	C
Stream D-ABC		2.7	24.85	0.73	C		0.8	12.69	0.43	B
Stream C-ABD		0.0	7.61	0.01	A		0.0	8.81	0.01	A
	2039 Baseflow									
Stream B-ACD	D7	0.0	0.00	0.00	A	D8	0.0	14.87	0.03	B
Stream A-BCD		0.7	12.98	0.38	B		1.9	21.31	0.63	C
Stream D-ABC		2.5	24.25	0.71	C		0.8	13.53	0.44	B
Stream C-ABD		0.0	7.76	0.01	A		0.0	9.01	0.01	A
	2039 Baseflow + Dev									
Stream B-ACD	D9	0.0	0.00	0.00	A	D10	0.0	16.12	0.03	C
Stream A-BCD		0.9	14.39	0.44	B		3.2	27.50	0.74	D
Stream D-ABC		4.8	41.03	0.84	E		1.0	15.66	0.51	C
Stream C-ABD		0.0	7.93	0.01	A		0.0	9.42	0.01	A

The summary of performance analysis indicates that during the Operational Phase Junction 4 (existing priority junction) will operate with negligible queues and delays pre and post the development during the morning and evening peak hours .

Table 5.9: Junction 5 - Proposed Priority Junction

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2024 Baseflow + Dev									
Stream B-AC	D1	0.4	12.04	0.27	B	D2	0.1	9.26	0.11	A
Stream C-AB		0.1	6.72	0.09	A		0.2	5.84	0.11	A
	2039 Baseflow + Dev									
Stream B-AC	D3	0.4	12.69	0.28	B	**D4**	**0.1**	**9.51**	**0.12**	**A**
Stream C-AB		0.2	6.73	0.09	A		**0.2**	**5.76**	**0.12**	**A**

The summary of performance analysis indicates that during the Operational Phase Junction 5 (existing priority junction) will operate with negligible queues and delays pre and post the development during the morning and evening peak hours .

The existing and proposed junction are projected to operate well within capacity as demonstrated in the tables above; therefore, the Project will have an imperceptible effect on the road network during operations. The Table below summaries the impact of the proposed development on the surrounding transport network and users.

Table 5.10: Summary of Impact Assessment

Mode	Cause	Impact
Construction Stage		
Traffic	Increased construction traffic flows onto existing roads network	Short-Term Slight Negative
Walking	Increased construction traffic flows resulting in an increased risk to existing pedestrian movements	Short-Term Not Significant Negative
Cycling	Construction Traffic Flows resulting in an increased risk on the existing cycle network	Short-Term Not Significant Negative
Operational Stage		
Traffic	Development-Generated Traffic added onto surrounding Road Network	Long-Term Not Significant Negative
Walking	An increase in pedestrian traffic to local schools, shop amenity and sports facilities, and to Ennis town centre	Long-Term Not Significant Positive
Cycling	An increase in cycle activity utilising existing network	Long-Term Not Significant Positive

5.6.6 Cumulative Assessment

The cumulative assessment considered all committed developments within the vicinity of the site and those which will have an impact on the junctions as identified previously. This includes sites which have previously been granted planning permission, but which are yet to become operational. Based on these projects, some potential cumulative impacts are discussed below.

There are two major housing developments adjacent to the proposed site. This consists of:

- Construction of 58 no. residential units comprising: 10 no. four-bed houses, 26 no. three-bed houses, and 22 duplex units comprising 11 no. two-bed ground floor apartment units with 11 no. three-bed house units. This development was granted planning permission in 2022. The development will be accessed via an existing priority junction along the Drumbiggle Road to the southeast of the site (Planning Ref: 21/599).
- Construction of 39 No. 2 storey dwelling houses and 3 No. Single storey dwelling houses. The development will be accessed via a new priority junction along the R474 Road south of the site. Work has already commenced on this development. A new footway is also being constructed along the road frontage of the site (Planning Ref: 17/237).

An allowance was made in the Traffic and Transport Assessment for the trip generation from the above committed development sites based on best predictions using all available information and in keeping with recognised standards. The analysis found that the housing units will result in a minor increase in the traffic on the R474 Circular Road, 54 trips predicted in the AM peak hour and 70 trips in the PM peak hour. The analysis indicated that traffic generated from the committed and proposed development will have a minimal effect on the existing traffic volumes on the network. Additional committed developments were also identified in the area, namely Planning Ref: 22/139, Planning Ref: 21/759 and Planning Ref: 18/8009. These developments were not incorporated into the assessment as they were deemed to have a minimal effect on the identified junctions.

This will result in a long term imperceptible negative cumulative impact on local traffic.

5.7 **Mitigation Measures**

5.7.1 Mitigation Measures During the Construction Phase

The Construction Environmental Management Plan (CEMP) includes proposed mitigation measures to minimise the impact of constructed related traffic on the modelled roads network. The construction stage of the proposed development will be complete in three phases as described in CEMP and the project is scheduled to begin construction in 2023 for a three-year period. It is envisaged that working hours will be 08:00am to 19:00pm Monday to Friday (08:00am to 14:00pm for Saturday) for construction personnel through each phase of the development. Generally, construction workers will travel to site before the measured peak hour of 08:00 to 09:00, to be on site for a 08:00 start-time. It is envisaged that a very limited number of construction employees are likely to travel to the site during peak hours.

It is anticipated that heavy goods vehicles, HGV's, will be restricted to movements on the local road network during the off-peak periods. It is estimated that truck movements and general deliveries would arrive/leave at a steady rate during the course of the day. It is envisaged that during the busiest period onsite, namely the groundworks element of the works, an estimated 12 no. HGV's will deliver to the site on a daily basis for the duration of this work element. HGV deliveries are envisaged at other periods during the construction phase but these are expected to be at a lower frequency. An estimated total of 920 HGV trips are envisaged throughout the course of the construction phase of the works.

A number of mitigation measures are proposed during the construction phase to minimise the impact, the measures are as follows;

- A detailed haulage plan will be put in place to ensure minimal impact on the surrounding road network. Spoil removal from site will be kept to a minimum with a detailed site survey completed to ascertain where spoil can be distributed on the site.
- All deliveries and removals will be subject to stringent site rules governing the loading / off-loading times, location of loading / off loading, covering of loads and cleaning of vehicles exiting the site, etc.
- Delivery loads to and from the site and management of large deliveries on site to occur outside of peak periods.
- No vehicle will be allowed to stop or park on the access road to the proposed development site.
- Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development.
- Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads. The provision of an on-site vehicle staging area will facilitate waiting vehicles.
- Routine sweeping/cleaning of the road and footpaths in front of the site; and
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.

There will be on-going monitoring of the impact of construction traffic on the wider roads network to ensure prompt action is taken in the event of an issue arising.

5.7.2 Mitigation Measures During the Operational Phase

Mitigation measures proposed during the operational stage are as follows;

- Provision of “STOP” road markings at the access junctions in accordance with Figure 7.35 of the Traffic Signs Manual (TII, 2019).
- Suitable Lighting of all junctions with lighting columns being positioned at the back of the footways.
- It is proposed to provide advanced warning signs on the R474 Circular Road as it approaches the site entrance. The signage will be in accordance with Chapter 6 of the Traffic Signs Manual (TSM) for road users travelling in the northern and southern direction towards the entrance to the development.
- The connection of the proposed development footpaths to the existing footpath network on the R474 Circular Road. This will allow connectivity to the existing Bus Stops in Ennis Town.
- The provision of bicycle stands and dedicated cycle routes through the development to encourage cycling.
- Charging points for electric vehicles are being provided
- A Mobility Management Chapter has been included as part of the Traffic and Transport Assessment, submitted as part of this application. This outlines the mobility strategy for the proposed development and includes measures for guiding the delivery and management of coordinated mobility management initiatives by the scheme promotor
- Provision of upgrade works on Circular Road (pedestrian facilities) as part of the proposed development

5.8 **Residual Impact**

As population grows throughout Ireland and in particular, in popular commuting hub areas like Ennis, a continued increase in traffic volumes is not sustainable. The governments modal shift targets are outlined in the Smarter Travel: A Sustainable Transport Future. The key targets of Smarter Travel are to reduce work-related commuting by car to 45%, and increase other modes such as walking, cycling, public transport and carpooling to 55%. As a result, an ever-increasing approach by designers and planners to providing sustainable commuting alternatives is required. The use of public transport and promotion of walking and cycling will ultimately increase the overall quality of life for the people living in these fast paced, busy towns and villages located within commuter belts.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National Cycle Manual, which promotes the use of sustainable travel to and from the site. The Road Safety Audit carried out for the site allowed the design team to address any concerns initially flagged in the Road Safety Audit. A continued and

collaborative approach with the road safety auditors meant that a desirable and safe site layout could be achieved without negatively impacting the overall quality of the development.

The use of the private car will still be maintained as a primary mode of transport for a number of the residents in the development. Trip generations to and from the proposed development are 180 in the morning peak and 143 in the evening peak as noted above. The internal roads on the development to be constructed have been suitable designed in accordance with the DMURS manual.

Progressive and regular liaising with Clare County Council Roads Department in relation to the internal roads and the permitted link roads layouts contributed to the final road design for the development.

As noted previously, mitigation measures are to be implemented to promote and encourage more sustainable transport modes. Footpaths on the R474 Circular Road will encourage pedestrians to walk to the Ennis Town Bus Stops which are 1.5km away from the site. The proximity of the Bus Stops will encourage pedestrians to utilise the higher frequency Public Transport options. Dedicated cycle routes and secure bicycle parking spaces are also provided throughout the development.

The proposed development is located close to a number of amenities such as local shops to the east of the proposed development, some 19 minutes walking (approx. 1.6km).

5.8.1 Significance of Effects

The junctions are predicted to operate below capacity without the development traffic in the future design years. The analysis predicts that the inclusion of the development traffic will result in a slight increase in the degree of saturation for the junctions, with all junctions forecast to continue to operate below capacity.

5.9 **Summary**

An assessment of the traffic impact of the proposed development in Ennis Co. Clare was undertaken. The site is forecast to generate 180 vehicle movements during the AM peak and 143 movements during the PM peak times.

The Road Safety Audit carried out for the proposed development during the planning stage considered various aspects such as, junction design, provision for pedestrians, provisions for cyclists and road signage, marking and lighting. Recommendations noted from the independent company undertaking the road safety audit, CST Group Chartered Consulting Engineers, have been taken into account and the concerns raised have either been designed out or will be considered and suitable measures put in place during the detailed design stage.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National Cycle Manual, which promotes the use of sustainable travel to and from the site.

5.10 **Conclusion**

Based on this assessment it is considered that in general, the traffic generated by the proposed development in Ennis, Co. Clare will be adequately accommodated on the local highway network in the vicinity. The junctions are predicted to operate below capacity without the development traffic in the future design years. The analysis predicts that the inclusion of the development traffic will result in a slight increase in the degree of saturation for the junctions, however all junctions are forecast to continue to operate below capacity.

The implementation of the Operational Phase mitigation measures, such as the pedestrian, public transport and cycling measures, a shift in the modal spilt can be accomplished resulting in a reduction in the impact on the junction capacities.

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

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CHAPTER 6

Material Assets: Services, Infrastructure and Utilities

August 2022

Glenveagh
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6 Material Assets: Services, Infrastructure and Utilities

6.1 Introduction

The purpose of this chapter is to describe the environmental impact of material assets of the proposed residential development. This report details the existing environment, the proposed development, and the predicted impact on the environment. It will describe the methodology used to assess the potential impacts from the proposed development on the material assets in the study area, to describe baseline environment of the material assets in the study area, assess the likely impacts on these material assets, and sets out mitigation measures to be put in place to reduce the likely impacts of the material assets on the environment. This chapter considers the impacts on the material assets and not the people using the assets. People along with issues and impacts are discussed in Chapter 13 (Population and Human Health).

Material Assets are resources that are valued and that are intrinsic to specific places. These may be economic assets of human or natural origin. With regard to Material Assets, the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) published by the Environmental Protection Agency (EPA) state:

> *"In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material Assets can now be taken to mean built services and infrastructure."*

Material Assets of a human origin include:

- Wastewater Network
- Surface Water Network
- Watermain Network
- Electricity Network
- Gas Network
- Telecom's infrastructure
- Waste

The proposed project is described in detail in Chapter 2 'Project Description'.

6.2 Author Information & Competency

This chapter has been prepared by Michael Naughton, TOBIN Consulting Engineers and James Molloy of Molloy Consulting.

Michael Naughton is a design engineer in the Building & Infrastructure sector with TOBIN. He also has over 19 years' experience in the building services industry also working across a number of projects in various sectors. Michael has an honours degree in Civil Engineering from National University Galway and is a member of Engineers Ireland.

James Molloy is a Building Services engineer with Molloy Consulting Engineers. He qualified with a Building Services degree from Munster Institute of Technology. James has 12 years' experience in the building services industry. James is skilled in Mechanical and Electrical design with a specialisation in street & sport lighting design.

6.3 Reference to Guidelines Relevant to Discipline

The Material Assets Assessment was prepared in accordance with relevant European Union and Irish legislation and guidance, and in accordance with Schedule 6 of the Planning and Development

Regulations 2001 as amended (S.I. No. 600 of 2001) and conforms to the relevant requirements as specified therein.

The following guidelines were referred to while preparing this appraisal:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA) (EPA 2022)
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003) (and revised advice notes (EPA 2015b).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018);
- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017)
- Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03, 2020)
- Code of Practice for Water Infrastructure (IW-CDS-5020-03, 2020)
- Recommendations for Site Development Works for Housing Areas, 1998

6.4 Methodology

The study area regarding utilities for the subject site comprises the main area of proposed construction works. The proposed residential development at Ennis, Co. Clare is in the administrative area of Clare County Council. The proposed project is described in detail in Chapter 2 'Project Description'.

6.4.1 Identification of Utilities

As part of the compilation of this EIAR chapter, the previously discussed guidance and advice, documents were studied to fully understand the constraints in a study area around the proposed development.

The scope of the investigation consists of a desk study, surveys and correspondence with utility providers. Water Services information (surface water drainage, foul water drainage and watermains supply) was received from Irish Water and Clare County Council.

Molloy Consulting reviewed the existing utilities (i.e., ESB, Gas & Telecoms) in the vicinity of the site to identify the serving of the development from same and any potential impacts of existing infrastructure. They also engaged with local engineers from Gas Networks Ireland and ESB to ascertain this information and access existing records in the vicinity of the development.

Mapping, where provided by these organisations, was overlaid with the project mapping and assessed.

6.4.2 Significance Criteria

Significance criteria for impacts on utilities are set out in Table 6.1 in accordance with the requirements of the following EPA guidance documents:

- Guidelines to Planning Authorities and An Bord Pleanála on carrying out EIA (Department of Housing, Planning and Local Government, 2018)
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

Table 6.1: Significance Criteria for Impacts on Material Assets - Utilities

Significance Level	Criteria
Profound	Profound impact occurs where there is permanent disruption to a utility service or where there is significant surcharging of an existing system.
Significant	Significant impact occurs where there is long-term disruption to a utility service or where there is minor surcharging of an existing system.
Moderate	Moderate impact occurs where there is medium-term disruption to a utility service or significant increase of flow within an existing system
Slight	Slight impact occurs where there is short-term disruption to a utility service or minor increase of flow within an existing system.
Imperceptible	Imperceptible impact occurs where there is temporary disruption to a utility service or no quantifiable increase of flow within an existing system.

6.4.3 Difficulties Encountered in Compiling Information

No difficulties were encountered in compiling the information

6.5 Description of Existing Environment

The Proposed Project is described in detail in Chapter 2 'Project Description'. The site of the proposed development is currently a greenfield site. The site is adjacent to Ennis Golf Club, North/North-East of the site. The west boundary is bounded by the N85 Ennis Bypass/Western Relief Road and the eastern boundary by the R474 Regional Road, Circular Road, into Ennis. There are 7 no. private residential homes between the eastern boundary of the site and the R474 and a small, newly built residential estate along the southern boundary of the site.

6.5.1 Wastewater Drainage

There are no records or evidence of any foul water infrastructure within the proposed site. The nearest existing foul sewer is a concrete, 225mm diameter located southeast of the site on the Cahercalla Road. This existing Sewer was surveyed by Land Surveys. The sewer is Irish water owned and flows to the Irish Water owned Ennis North Wastewater Treatment Plant.

6.5.2 Surface Water Drainage

There is no existing surface water network within the existing site. It is evident that existing rainwater drainage from the site is by means of direct infiltration and percolation into the existing agricultural ground. The local groundwater flow direction is likely to mirror the site topography and catchment drainage. The greenfield run off from the site, due to the existing topography, travels in a north and northwest direction towards the Claureen River.

6.5.3 Watermain Network

There is an existing 600mm diameter ductile iron watermain located on the western boundary of the N85. This is on the opposite side of the National Road to the site. There is also a 350mm diameter Asbestos watermain on the R474 circular Road on the eastern boundary of the site. Both watermains are owned and controlled by Irish Water.

6.5.4 Electricity Supply

There are existing power lines running along the eastern boundary of the site, this development proposes to underground the power line. There is a 10kV line running from south to north through the site that will also need to be undergrounded.

There will be 2 no. new substations constructed. One at the rear of the creche located near the entry to the estate and the other located in the centre of the eastern boundary. The proposed substations will provide power to several mini pillars which will provide power to the residential dwellings.

6.5.5 Natural Gas

There is no existing gas infrastructure near the proposed development and all of the proposed residential units and the creche will be served by electric air-to-water heat pumps due to the requirement to meet Part L of the Building Regulations, of which L1 states that "A building shall be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of carbon dioxide (CO2) emissions associated with this energy use insofar as is reasonably practicable". Heat pumps run at an energy efficiency of approximately four times greater than gas and are a renewable form of energy which is a requirement of the building regulations. No connections to the natural gas network will be required.

6.5.6 Telecoms / Communications

Virgin and eircom networks are installed along the central local road and the design of the network has allowed for a connection to the proposed residential development.

6.5.7 Waste

The site is a greenfield with no waste facilities. There are currently waste collectors collecting the waste from the dwellings north of the development and it is anticipated that during the operational phase a similar plan will be in place.

6.6 Characteristics of Proposed Development

The proposed project is described in detail in Chapter 2 'Project Description'.

6.6.1 Proposed Wastewater Drainage

The proposed wastewater drainage system for the development will consist of a combination of gravity and pumped discharge to a local gravity wastewater sewer. Due to site topography a pumping station is required to service the development which will be located to the north of the site.

Existing levels on the site won't allow a gravity connection to the existing 225mm wastewater sewer on Cahercalla Road, therefore all wastewater from the development will flow via gravity to the pumping station, located strategically in the North of the site. A new 150mm wastewater sewer will also be laid on the R474 circular road, connecting to the proposed wastewater sewer network within the development. This is to enable 7 no. existing dwellings connect to the sewer mains should they need to in future.

From the pump station the wastewater will convey through a 110mm diameter Rising Main to the existing gravity sewer. Before discharging to the existing sewer, the wastewater will first discharge to a newly constructed discharge manhole, with a vent stack to eliminate odour, located near the existing gravity network, as per Irish Water standards.

The pumping station will be designed to be capable of facilitating the proposed development while also allowing for possible future connection for the 7 no. existing dwellings facing onto the R474, Circular Road and the small parcel of lands adjoining the applicants site boundary to the south.

The proposed foul network has been designed in accordance with the Irish Water Specification and has been designed to cater for 6 times the dry weather flow rate. A Statement of Design Acceptance has been obtained from Irish Water and forms part of this application as an appendix of the Civil Works report provided by TOBIN Consulting Engineers.

The laying/construction of the foul network will be a standard trench excavation and kept as shallow as possible, adhering to Irish Waters Codes of Practice. All wastewater designs will be fully vetted by Irish Water prior to receiving an offer to connect. Refer to Engineer's drawings numbers 11269-21 for Proposed Wastewater layout and details.

- **Possible Effect:** Release of effluent from wastewater systems has the potential to impact on groundwater and surface water
- **Significance of effect:** No significant effects on surface water or groundwater quality are anticipated
- **Effect on European Site:** No effect on European Site is anticipated.

6.6.2 Proposed Surface Water Drainage

It is proposed to use a Sustainable Urban Drainage Systems, (SuDS) approach to surface water management throughout the site. This overall strategy aims to provide an effective system to mitigate the adverse effect of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, and reducing pollutant concentrations in surface water and emulate the greenfield runoff rate. The proposed SuDS features in the development are permeable paving on driveways, cellular underground soakaways, petrol interceptors and a hydro brake flow control.

The proposed surface water drainage network has been designed into 7 no. catchment areas for the development. The surface water will flow to soakaways for 6 of the catchment areas and to an infiltration basin for the northernmost catchment area. The soakaways and the infiltration basin have been designed to a cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

The soakaways have been designed using infiltration rates from a Site Investigation carried out by Grounds Investigation Ireland which is attached in Appendix 6.1 of the EIAR. The infiltration rates were obtained by Soakaway Testing to BRE Digest 365. A conventional infiltration rate for each soakaway was used in the design and a factor of safety of 2. The surface water in each soakaway will infiltrate to the ground, as it would naturally in a green field site. Prior to entering each soakaway, the surface water will flow through petrol interceptors to remove any hydrocarbons the water may contain.

An infiltration basin has been designed to cater for the northernmost catchment area of the development. The surface water will also flow through a petrol interceptor before entering the basin. An outfall from the basin is proposed at invert level, which will connect to a hydro brake manhole.

The infiltration basin has been designed to cater for the catchment area and the overflows from each of the soakaways if needed. The basin is relatively shallow at 1.5m, designed with 4No. step formations at a 1/4 slope. Refer to engineers drawing for details.

The infiltration basin provides several forms of treatment to the collected water within it. As a result of the size of the basin, much of the bacteria and pollutants that enter the basin settle over time prior to reaching the outfall pipe. Furthermore, infiltration basins can support vegetation and plant life, which provide further pollutant treatment and removal. The plants absorb dissolved pollutants and convert them into less harmful materials. Microorganisms present in the basin can further treat and breakdown pollutants that include bacteria, nitrogen, phosphorus, total suspended solids, oil and particulate matter from vehicles.

Energy from inflowing stormwater as it enters the infiltration basin is absorbed by any water already in the basin, thus inflowing water does not cause erosion of materials at the base of the basin. Infiltration basin also provide water quantity control as they retain the runoff and release it into watercourses at a pre-development flow rate.

Surface water from the infiltration basin shall discharge into the Claureen River via a hydro brake manhole. The hydro brake will discharge surface water at a controlled rate to the Claureen River,

located North of the site. The outfall pipework conveying the surface water discharge will run along the corridor of the N85. A letter of consent has been received from Clare County Council for this and forms part of this application. The amount of water discharging will be under the allowable Greenfield Runoff rate, which has been calculated at 17.8 l/s due to the developable area, 8.9Ha, of the site. The surface water will flow through a bar screen at either end of the outfall pipe which will mitigate against debris/litter entering the Claureen River.

The storm drainage has been designed using the 30 and 100-year return period plus an additional 20% to account for the effects of climate change.

- **Possible Effect:** Replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. All surface water arising on site will drain to the Inch River via a stormwater infiltration basin at a controlled rate.
- **Significance of effect:** The risk of pluvial flooding is minimised by the drainage network set-up, Controlled discharge rate as per the greenfield runoff-rate, gullies strategically located and the use of the infiltration and soakaways for surface water storage.
- **Effect on European Site:** No effect on European Site is anticipated
- **Possible Effect:** Release of pollutants and hydrocarbons from surface water runoff on impermeable areas.
- **Significance of effect:** The risk of hydrocarbons and pollutants entering the natural watercourse is eliminated by the introduction of a petrol/oil interceptor prior to discharging to the infiltration basin. The infiltration basin will also act as a pollutant treatment.
- **Effect on European Site:** No effect on European Site is anticipated

6.6.3 Proposed Watermain Network

It is proposed to connect a 150mm diameter watermain to an existing 350mm asbestos watermain, at the site entrance on the R474 Circular Road. All watermain designs will be fully vetted by Irish Water prior to receiving an offer to connect. The 150mm diameter watermain will be constructed and connected in accordance with Irish Water requirements.

The water supply required for the proposed development shall be via a 150mm diameter watermain along the main spine road of the development. A 100mm diameter PE watermain will breach off this spine main to service the clusters of houses/Cul-de-sacs.

- The watermains will be constructed via shallow excavation.
- **Possible Effect:** Excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works. Construction activities can result in the release of suspended solids to local drainage features and can result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Surface waters are expected to stay within the site boundary and percolate through the soil/subsoil.
- **Significance of effect:** Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work. Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present. These will be embedded into the local soils to ensure all site water is captured and filtered. Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses.
- **Effect on European Site:** No impacts on water quality or downstream designated sites are anticipated.

6.6.4 Electricity Overview

New electricity services infrastructure will be put in place to serve the proposed housing development. We will need to undertake the preparatory work such as installation of ducting and provision of substation plinth or building. All installations to be carried out in accordance with IS10101. Trench and duct installation in relation to the ESB Scope of Works to be carried out in accordance with ESB Networks Technical Guidance Document Current Edition Code of Practice. Prior to back filling and making good ESB Trench the contractor shall request ESB attendance to site to review and approve ducting provision.

6.6.5 Natural Gas Overview

The proposed project will not require any gas connections. Neither is there any existing gas infrastructure within the vicinity of the proposed development.

6.6.6 Telecoms Overview

New telecom services infrastructure will be put in place to serve the housing development. Trench and duct installation in relation to the Eircom Scope of Works to be carried out in accordance with Eircom White Guidance Document current edition. Prior to back filling and making good Eircom trench the contractor shall request Eircom attendance to site to review and approve ducting provision.

6.6.7 Waste

The site is a greenfield with no waste facilities. There are currently waste collectors collecting the waste from the dwellings located to the south and west of the proposed development and it is anticipated that during the operational phase a similar plan will be in place. The estimated earthwork volumes are outlined in more detail in Chapter 7 of this EIAR.

6.6.8 Estimated Earthwork Volumes

Removal of the existing topsoil layer will be required. It is expected that all stripped topsoil will be reused on site. Estimated volumes have been stated in chapter 7 of this EIAR. It is noted that these volumes are estimations and that a full cut and fill exercise would be needed to establish exact volumes.

A construction waste management plan has been prepared and forms part of this application as a separate document. Soil and stones typically make up a significant proportion of construction waste. It is anticipated that the majority of excavation wastes will be re-used on site for landscaping and site restoration purposes. Any bedrock excavated shall be tested and if suitable re-used as fill under roads and footpaths.

6.7 Predicted Impacts

This section provides a description of the specific, direct and indirect impacts that the proposed development may have during the construction and operational phase of the proposed project. The mitigation measures for the construction and operational phase are outlined in section 6.5 of this report.

6.7.1 Do Nothing Scenario

The “Do Nothing” scenario refers to what would happen if the proposed development was not implemented.

Upgrade works are required at the Wastewater Treatment Plant as part of Irish Waters Capital Investment (CIP). The works, as stated, are to be carried out by Irish Water. It has also been stated by Irish Water that these works will not affect the development should it go ahead as there is sufficient capacity to accept the development.

6.7.2 Do Something Scenario

Should the proposed development proceed as planned, it will impact upon material assets in the vicinity of the proposed works. The development has been designed to take account of the identified material assets and the implementation of the mitigation measures outlined in this chapter and will help reduce any negative impact on these material assets.

6.7.3 Construction Phase

6.7.3.1 Wastewater Infrastructure

The contractors' operations will generate effluent and sanitary waste from facilities provided for the work force on site. The laying of underground wastewater pipes as part of the project works has the potential to directly impact the wastewater service network. These impacts will be slight to moderate.

Traffic will also be affected during the construction phase when connecting the proposed wastewater network to the existing as the connection location to the existing wastewater network is circa 350m away from the site entrance. Therefore, will consist of a rising main being constructed on the public road to this network. A new discharge manhole will also need to be constructed prior to the wastewater discharging to the existing network, as per Irish Water standards.

These works will have a significant effect on traffic as a section of the road will need to be closed during the works until completion. Traffic movements associated with the proposed development are addressed within Chapter 5 – Traffic of this EIAR, this chapter specifically deals with traffic and the impact of the development on road infrastructure. A construction traffic management plan (CTMP) has been prepared by TOBIN to help reduce the impact of traffic during the works period. The CTMP will also form part of this application which will protect local amenities and the operation of the local road network. No long-term impacts are envisaged on the existing wastewater network from the construction stage.

6.7.3.2 Surface Water Infrastructure

Surface water run-off from construction activities has the potential to be contaminated. There is a potential for unrestricted surface water runoff from the site, ingress of groundwater and overland flows into excavations during construction. This has the potential to directly negatively impact the receiving waters immediately adjacent the site as well as the downstream receiving waters, i.e., the Claureen River. This could result in a moderate short-term negative impact on the quality of water in the adjacent watercourses as well as increased flood risk in the adjacent lands and will require appropriate environmental controls. The laying of underground surface water pipes as part of project works has the potential to directly impact the surface water drainage within the site. Replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Gullies will be strategically located in the roadways at local low points to collect the surface water and discharge it to the surface water sewer network.

6.7.3.3 Watermains Infrastructure

During the construction of the watermain network, there is likely to be brief disruption to the quality of the local water supply to facilitate connections to the network. All such temporary shutdowns will be agreed with Irish Water in accordance with the appropriate procedures and people that will be affected will be advised in advance of the short-term impacts that they may experience.

There is a slight risk of contamination to the existing water supply during the construction phase when the development is being connected to the water supply. Irish water Codes of practice will be adhered to during the connection works to ensure minimal disruption to the network and to ensure the water supply avoids contamination.

6.7.3.4 Electricity Infrastructure

The laying of underground electrical cables as part of project works has the potential to directly impact the electrical network service. There is potential for unidentified electrical cables to be damaged during the construction phase. Utilities will be further identified and mapped during the detailed design stage. Potential slight negative temporary impacts on electrical power could arise during the construction of the proposed development. The outage will be agreed with the ESB, local residents and businesses will be notified in advance and the potential impact from the construction phase of the proposed development on the local electrical supply network is likely to be brief and imperceptible.

6.7.3.5 Natural Gas Infrastructure

There is no proposed gas component or existing natural gas infrastructure that will be affected by our proposed development.

6.7.3.6 Telecoms Infrastructure

The laying of underground electrical and telecoms cables as part of project works has the potential to directly impact the electrical and telecoms network services. Communications infrastructure is present throughout the subject area. There is potential for unidentified utilities to be damaged during the construction phase. Utilities will be further identified and mapped during the detailed design stage. Potential brief imperceptible impacts on public utilities could arise during the construction of the proposed development.

6.7.3.7 Waste

The site is a greenfield with no waste facilities. The construction phase of the proposed development will give rise to the requirement to remove or to bring to the site quantities of materials, including excavated material not suitable for reuse. Construction related material will also be created on the proposed development site. This has the potential to impact on the local municipal waste disposal network, but this will be short term and moderate. Refer to the Construction Waste Management Plan which has been prepared as a separate document by TOBIN and has been submitted with this application.

6.7.3.8 Noise

The development proposes to have one singular vehicular access from the Circular Road. Heavy duty vehicles that may access the site may cause high levels of noise in that area. There may also be construction noise from excavations and any rock breaking. To reduce the noise impact on the local area, vehicles will only have access to the site between the hours of 8am to 6pm with work hours limited to these times as well. A Construction Traffic Management Plan and a Construction Environmental Management Plan and will be prepared for the project and will form part of this application.

6.7.4 Operational Phase

The proposed project is described in detail in Chapter 2 'Project Description'.

6.7.4.1 Wastewater Infrastructure

The operation of the development will result in the increase of generation of effluent and sanitary waste from the proposed development. This has the potential to impact the existing wastewater infrastructure directly negatively in the vicinity of the site and result in a significant long-term impact on the capacity of the existing infrastructure.

6.7.4.2 Surface Water Infrastructure

Surface water runoff from operational activities has the potential to be contaminated. The operation of development has the potential to result in a large volume of surface water discharge in the absence of controls and measures to limit off-site discharge. This has the potential to impact the adjacent watercourses directly negatively. It could cause significant long-term negative impact on the water quality and quantity within the adjacent watercourses if appropriate controls are not put in place.

6.7.4.3 Watermain Infrastructure

The operation of the development will result in the increase in the quantity of water to be treated and supplied through the network. This has the potential to impact the existing water infrastructure directly negatively in the vicinity of the site and result in a significant long-term impact on the capacity of the existing infrastructure.

6.7.4.4 Electricity Supply

The impact of the operational phase of the proposed development on the electricity supply network is likely to increase the demand on the existing supply. The existing network has the capacity to cater for the proposed development. There are no impacts to be considered.

6.7.4.5 Natural Gas Infrastructure

All houses will utilise Air to Water Heat pumps which will negate the need for gas. No impacts on supply are anticipated.

6.7.4.6 Telecoms Infrastructure

The installation of the telecoms will be in accordance with the requirements of the utility provider and will be carried out by approved contractors. There will be no impact in the operational phase of the telecoms network. The existing network has the capacity to cater for the proposed development.

6.7.4.7 Waste

There will be an increased demand on the municipal waste disposal system operated by Clare County Council. All the waste generated will be subject to the "County Clare Waste Management By-Laws, 2018". The impact is likely to be long term and imperceptible due to the development of 289 residential units and increase in demand. There is a storage area being provided for waste for all the residential units within the development and the creche.

6.7.5 Cumulative effects

Material assets will interact with other EIAR topics given the nature of the works. Project related traffic will also interact with the land resource in the area which is predominately urban and agricultural. Mitigation measures have been proposed within this EIAR to eliminate and reduce any adverse effects from this interaction on the land. The raw materials needed for the project also interact with the project traffic. Materials will be reused where possible. The methodologies chosen at design stage will result in a decrease in the amount of imported material, which in turn will reduce the impact of traffic on the surrounding roads and will result in less demand on non-renewable sources such as quarries.

Where roads are opened for the installation of cables or pipelines, interaction will occur between material assets (namely the local road network and utility providers), traffic and population. Further consultation will be undertaken with utility providers in the project detailed design stage and mitigation measures put in place to minimise any adverse impacts.

The cumulative effect of the development on the foul, surface water, watermain and waste management systems are anticipated to be short term, neutral, and imperceptible. No significant impacts are anticipated.

Regarding the cumulative impact of the interactions of impacts, it is unlikely that any of these interactions will result in significant additional impacts that are not already anticipated in this EIAR. It is predicted that the proposed development will contribute to the improvement of the overall urban environment.

6.8 Mitigation and Monitoring Measures

Following an assessment of the potential impacts the proposed development was methodically reviewed and mitigation methods were developed that will avoid, prevent or reduce any negative effects on the environment.

All possible measures will be taken to avoid unplanned disruptions to any services within the site during construction of the proposed development. It should be noted that several mitigation measures are proposed in other chapters of this EIAR.

6.8.1 Construction Phase Mitigation

The following mitigation measures are proposed for the construction phase of the development with respect to Material Assets:

- The proposed development should comply with the provisions of the Construction Waste Management Plan with respect to construction waste.
- The proposed development will comply with the provisions of the Construction Environmental Management Plan.
- Water metering will be provided during the construction phase to record consumption.
- All new services will be constructed and provided in strict accordance with the codes of practice of the relevant utility company and new connections to have an agreed permit for the works where required.
- To minimise impact of the wastewater/water infrastructure required for the development, best practise construction practices should be adhered to, and Irish Water procedures followed.
- Temporary measures such as silt traps will be put in place to limit the rate of surface water runoff form site.
- The quality of surface water runoff to be managed and ensure the run-off from the site does not result in excessive siltation of the receiving drainage channels.
- Excavations are to be kept to a minimum, with excavated material stockpiled for reuse or removed off-site following removal of waste material regulations
- The contractor also will be obliged to put measures in place to ensure that there are minimal or no interruptions to existing services, and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.
- All watermains will be cleaned and tested in accordance with Irish Water guidelines and standards prior to connection to the public watermain.
- All works in the vicinity of the local authority will be in compliance with any requirements or guidelines
- Road opening licences will be applied for and a temporary traffic management plan to be implemented when connecting utilities in the public road.

Consideration will be given to the sustainable sourcing of all materials and will be reused where possible. The methodologies chosen at design stage, will result in a decrease in the amount of imported material, which in turn will reduce the impact of traffic on the surrounding roads and will result in less demand on non-renewable sources such as quarries.

Other mitigation measures which will be employed in relation to raw materials are as follows:

- Design will be optimised to minimise the requirements for raw materials.
- Materials will be reused where possible.

- Raw materials will be sourced locally where possible; and
- Raw materials will be managed in accordance with the CEMP for construction.

6.8.2 Operation Phase Mitigation

The following section discusses the mitigation approaches that will be followed during the operational phase of the development:

- All new foul and surface water drainage pipes to be pressure tested and CCTV to identify any possible defects.
- Water conservation measures to implemented, which include water metering, recycling vehicle wash waters, rainwater capture, low flush, waterless urinals, spray taps, efficiency attachments.
- Ensure that all Hydro brakes are designed to limit the flow of water from the development to the greenfield run off.
- All watermain pipes to be pressure tested in accordance with Irish Water details.
- All watermains will be cleaned and tested in accordance with Irish Water guidelines and standards prior to connection to the public watermain.

Irish Water have confirmed that a wastewater connection for the development is feasible and have issued a confirmation of feasibility letter (COF), refer to appendix 6.2 of the EIAR. They have also stated that upgrade works are to be carried out downstream of the development as part of Irish Waters Capital Investment Plan (CIP), however they have noted that the latest capacity register can accept the proposed development. Connection agreements will be made with Irish Water regarding wastewater discharge off site. As Irish Water have confirmed that the system has capacity to accommodate the proposed development significant impacts to the system therefore not considered likely. No additional mitigation measures will be required.

The surface water drainage has been designed to accommodate the greenfield run-off from the proposed development. As the flow will be generated by 7 no. catchment areas and it will be limited to the existing greenfield runoff rate of each catchment and will be attenuated to reflect the greenfield run off rate. Due to measures already incorporated in the design as outlined in Section 6.7.3, no additional mitigation measures will be necessary on surface water during the operational phase.

Irish Water have confirmed that there is enough capacity in the Irish Water network to supply the development. All plumbing fixtures and fittings to be installed within the development should be to the current best practice for water consumption to minimize future water usage. As Irish Water have confirmed that the existing Irish Water watermain has capacity to accommodate the proposed development, significant impacts to the system therefore not considered likely. No additional mitigation measures will be required.

6.9 Residual Impacts

6.9.1 Construction Phase

The construction stage of the proposed development will comprise of site clearance and preparation, excavation and the construction of the proposed development. The potential impacts associated with the construction stage of the proposed development on material assets are likely to be temporary and will cause minor/short term disturbance. Provided mitigation measures are adhered to as part of this development, there is unlikely to be any adverse impacts on material assets during the construction stage and any residual impacts on the existing foul and waste systems would be temporary and slight.

6.9.2 Operational Phase

The proposed development will have a positive impact on the surrounding environment by providing much needed housing in the area and meeting the needs of the growth population.

The loading in the wastewater and watermains from the proposed development will be adequately accommodated in the foul and watermain network. Upgrade works to the nearby wastewater treatment plant will be beneficial to developments in the surrounding area.

In compliance with the SUDS manual the runoff from the development will mimic the existing greenfield run off and hence have no impact in the surrounding network. Improved controls on the surface water along with silt management and/or silt traps the proposed development will result in an improvement in the quantity and quality of discharge off site.

6.9.3 Monitoring

The only monitoring proposed is of water storage. Once operational water usage will be monitored by a bulk meter and compared to anticipated usage. This will allow Irish Water to monitor any potential leaks.

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

CHAPTER 7

Geology, Land and Soils

August 2022

Glenveagh
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CHARTERED PLANNING CONSULTANTS

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7.1 Introduction

This chapter of the EIAR comprised of an assessment of the likely impact of the proposed development on soils and the geological environment as well as identifying proposed mitigation measures to minimize any impacts.

The project comprises the development of 289. residential units and a creche facility and the Proposed Project is described in detail in Chapter 2 'Project Description'. The site of the proposed development is currently a greenfield site. The site is adjacent to Ennis Golf Club, North/North-East of the site. The west boundary is bounded by the N85 Ennis Bypass/Western Relief Road and the eastern boundary by the R474 Regional Road, Circular Road, into Ennis. There are 7 no. private residential homes between the eastern boundary of the site and the R474 and a newly built residential estate along the southern boundary of the site. In addition, the development will also include ancillary public open space, ancillary residential parking spaces.

7.1.1 Author Information and Competency

TOBIN Consulting Engineers were appointed to complete the Geology, Land and Soils Chapter for this Environmental Impact Assessment (EIAR) required for the proposed Strategic Housing Development. The work was completed by John Dillon and John is Professional Geologist (P.Geo.) and chartered waste manager (MCIWM) in the Energy and Environment section of TOBIN. John provides project management, project co-ordination and specialist contribution to hydrogeology reports for Planning Applications, Environmental Impact Statements and waste licence applications. John has over fifteen years' experience in the areas of environmental management and assessment with particular reference to the transmission line projects, energy projects, hydrogeological projects and public consultation. John has been involved with the project management and co-ordination of Environmental Impact Assessment Reports, waste licence/permit applications, design and planning applications for retail/commercial developments, waste management facilities and quarries nationwide. John has contributed to Screening Reports and Natura Impact Statements for wastewater treatment plants, pipeline projects, solar farm and wind energy developments and has defended Appropriate Assessments at Oral Hearings for waste management facilities, high voltage powerline projects.

7.2 Methodology

Assessment of the likely impact of the proposed development on soils and the geological environment includes the following activities:

- Review of information available on the Geological Survey of Ireland (GSI) online mapping service
- Ground Investigations for the proposed development were carried out by GII in July 2021 and included the following scope of work:
    - Visit project site to observe existing conditions
    - 16 No. Trial Pits to a maximum depth of 3.2m bgl
    - 3 No. Soakaways to determine a soil infiltration value to BRE digest 365
    - 63 No. Dynamic Probes to determine soil strength/density characteristics
    - 4 No. Cable Percussion boreholes to a maximum depth of 1.0m bgl
    - 4 No. Rotary Core Boreholes to a maximum depth of 6.90m bgl
    - Geotechnical & Environmental Laboratory testing
    - Report with recommendations

Refer to Appendix 6.1 Ground Investigation Report prepared by GII. A site specific Site Investigation (SI) on the nature and depth of the subsoil around the site consisting of 16 no. trial pits was completed on the site in November 2021. The trial pit logs from this investigation were provided to TOBIN.

Consultation was carried out with the relevant bodies by the project planning co-ordinator, including An Bord Pleanála (AB), the GSI, Clare County Council and the EPA. A summary of the third-party responses received are included in Chapter 1 of the EIAR and presented in Appendix 1.1

7.2.1 Legislation

This impact assessment of the Proposed Project has been carried out in relation to the relevant European and National legislation and other statutory policies and guidance. The methodology adopted for this assessment considered the following legislation:

- Planning & Development Acts 2000-2021; European Union (Planning and Development) (Environmental Impact Assessment) Regulation 2018
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU;
- European Commission (EC) Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (EC 2017);
- European Communities (Water Policy) Regulations 2003 [S.I. No. 722/2003];
- Waste Management Act 1996 as amended;
- European Communities Environmental Objectives (Groundwater) Regulations 2010 [S.I. No. 9/2010];
- European Communities (Environmental Impact Assessment) (Amendment) Regulations, 2001 [S.I. No. 538/2001];
- Groundwater Directives (80/68/EEC) and (2006/118/EC); and
- Water Framework Directive (2000/60/EEC).

This Chapter has been prepared using the recommendations set out in the following:

- European Commission (2017) Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)
- Environmental Protection Agency's (EPA) Guidelines on the Information to be contained in Environmental Impact Statements (March 2002);
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022);
- EPA's Advice Notes on Current Practice in the Preparation of EIS (2003);
- Department of Housing, Planning and Local Government's Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- The guidelines and recommendations of the Institute of Geologists of Ireland (IGI) publication Geology in Environmental Impact Statements – A Guide (IGI 2002 as amended);
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI 2013) were also taken into account in the preparation of this Chapter; and
- The guidelines and recommendations of the National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) were considered relevant in the preparation of this Chapter.

7.2. 2 Difficulties Encountered In Compiling Information

No significant constraints were encountered during the compilation of this Chapter. A robust evaluation of the likely significant effects of all aspects of the Proposed Project has been undertaken for the purpose of preparing this EIAR.

7.3 Receiving Environment

The detailed description of the proposed development and construction activities are provided in Chapter 2 Project description of the EIAR. Infill Material will be imported on-site. This material will be either quarried product from quarries that have planning permission; greenfield/inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-

products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

Existing ground levels are approximately 5mOD at the northern redline boundary at the River Claureen, with levels within the developable area ranging from approximately 13.4mOD at the north-eastern corner to approximately 31.2mOD at the southwestern corner.

The site is predominantly in agricultural use currently with the exception of a few residential properties on the site boundaries. The site comprises of a series of irregularly shaped fields divided by hedgerows and some scrub typical of an agricultural setting. The site does not contain any existing dwellings and farm outbuildings. The western proposed development boundary is bounded by the Ennis western bypass. According to EPA data (2022) there are no licensed activities within the site boundary of the proposed development or directly adjacent to it.

7.3.1 Soils and Subs

No significant constraints were encountered during the compilation of this Chapter. A robust evaluation of the likely significant effects of all aspects of the Proposed Project has been undertaken for the purpose of preparing this EIAR.

7.3.2 Soils and Geology

Review of information available on the GSI's online mapping service ("Quaternary Sediments") indicate that the site is underlain predominantly by a sediment type described as "TLs – Till derived from limestones". Refer to Figure 7.1 below.

Ground conditions at the site, as observed during Preliminary Ground Investigations, are summarised as follows:

- Topsoil
- Cohesive Deposits
- Weathered Bedrock
- Bedrock

Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.3m below ground level (m bgl).

Cohesive Deposits: Cohesive deposits were encountered beneath the topsoil and were described typically as brown sandy gravelly SILT or CLAY with occasional cobbles and boulders. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits was generally Firm below the topsoil but occasionally was soft to firm. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs. Three boreholes were undertaken as part of the site investigation works and generally observed gravelly SILT from 3.0m (trial pit target depth) to 8.8m below existing ground level. There are no peat soils on site.

Weathered Bedrock: In some of the exploratory holes weathered rock was encountered which was diggable with the large excavator to a depth of up to 1.0m below the top of the stratum in one of the pits. This material was recovered typically as angular gravel and cobbles. Some clay and sand were also present with the rock mass either from weathering or as infilling to fractures which were opened upon excavation.

Bedrock: The rotary core boreholes recovered Strong massive grey fine to medium grained. This is typical of the Aillwee Member, which is noted on the geological underlying the proposed site. The depth to rock varies from 1.06m bgl in RC04 to a maximum of 2.6m bgl in RC03. The total core recovery is good, typically 100%. The SCR and RQD both mostly ok across the site due to rock type massive. Ground water was noted at approximately 4 metres in one of the boreholes and in a small number of trial pits generally below 1 metre.

Infiltration tests were carried out at eight locations. Tests results indicated infiltration rates (f) ranged from 0.00238 m/min. There is a variation in soil type across the site with low percolation noted in clay-based soils and test failures where high water table is present. Infiltration tests in the granular soils indicate that it should be suitable for dispersion of surface water

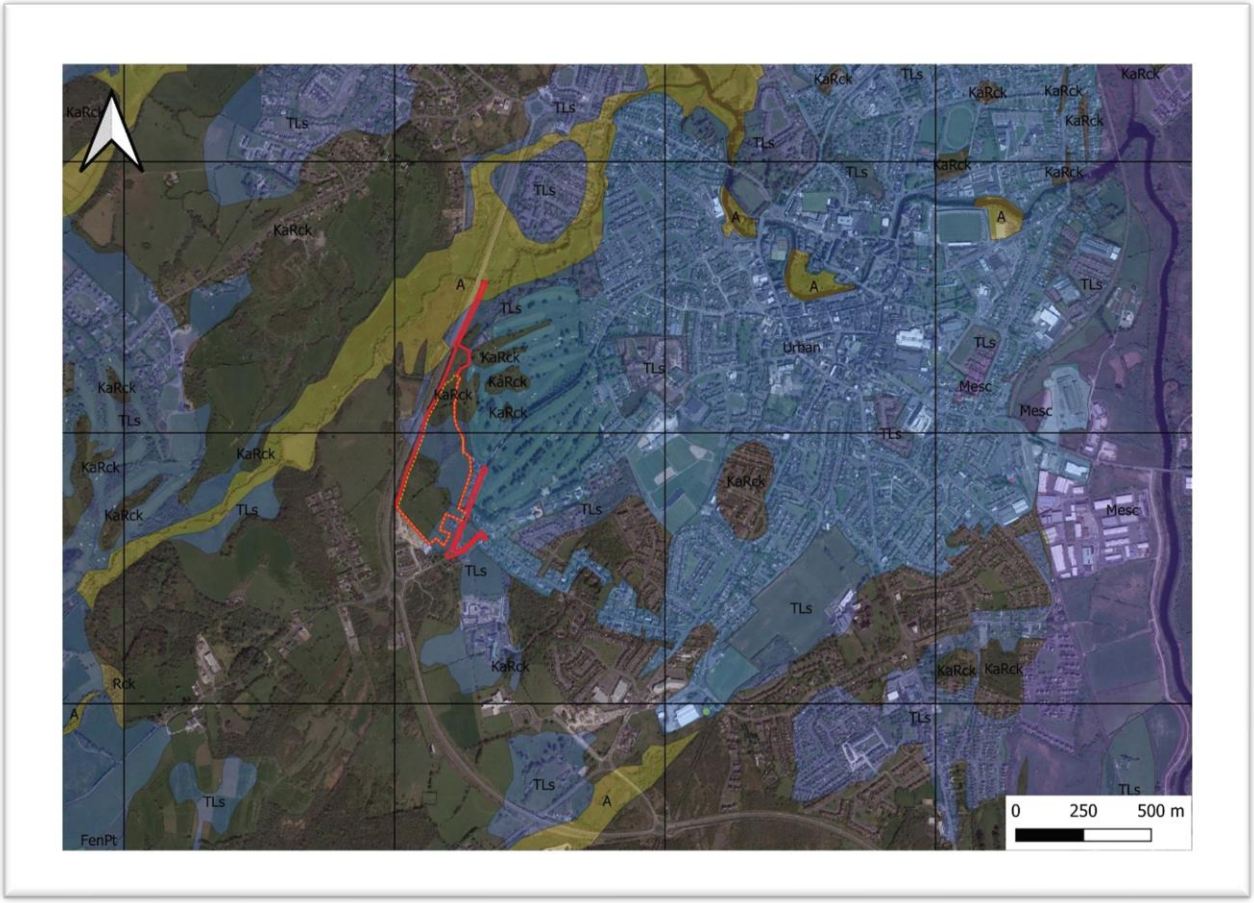

Figure 7.1: Subsoils Map

7.3.2 Geology

Review of GSI's online mapping service ("Bedrock Geology") describes geology in the vicinity of the site as Tournaisian to Chadian – Arundian stage which is part of the Dinantian Series of the Carboniferous Era (GSI Bedrock Sheet 14 and on-line mapping database) shows that the bedrock geology of the site.

The site is located over massive limestones - Combined Aillwee (BUaw) and Maumcaha (BUmc) Members of the Burren Formation. The Burren Formation is made up of pale grey clean skeletal limestone. The Burren Formation is bounded by the Tubber Formation to the east and the Slievenaglasha Formation to the west.

GSI have classified the site's groundwater vulnerability as "extreme to high" for the majority of the site with "extreme" and "Rock at or near surface or Karst" in a small portion of the site. Refer to Chapter 8 (Hydrology) of this EIAR for further comment regarding Hydrogeology.

7.3.3 Geological Heritage

A review of the on-line GSI and EPA web mapping indicates that there are no active or historical quarries or mines in the locality and no geological heritage sites within the proposed development.

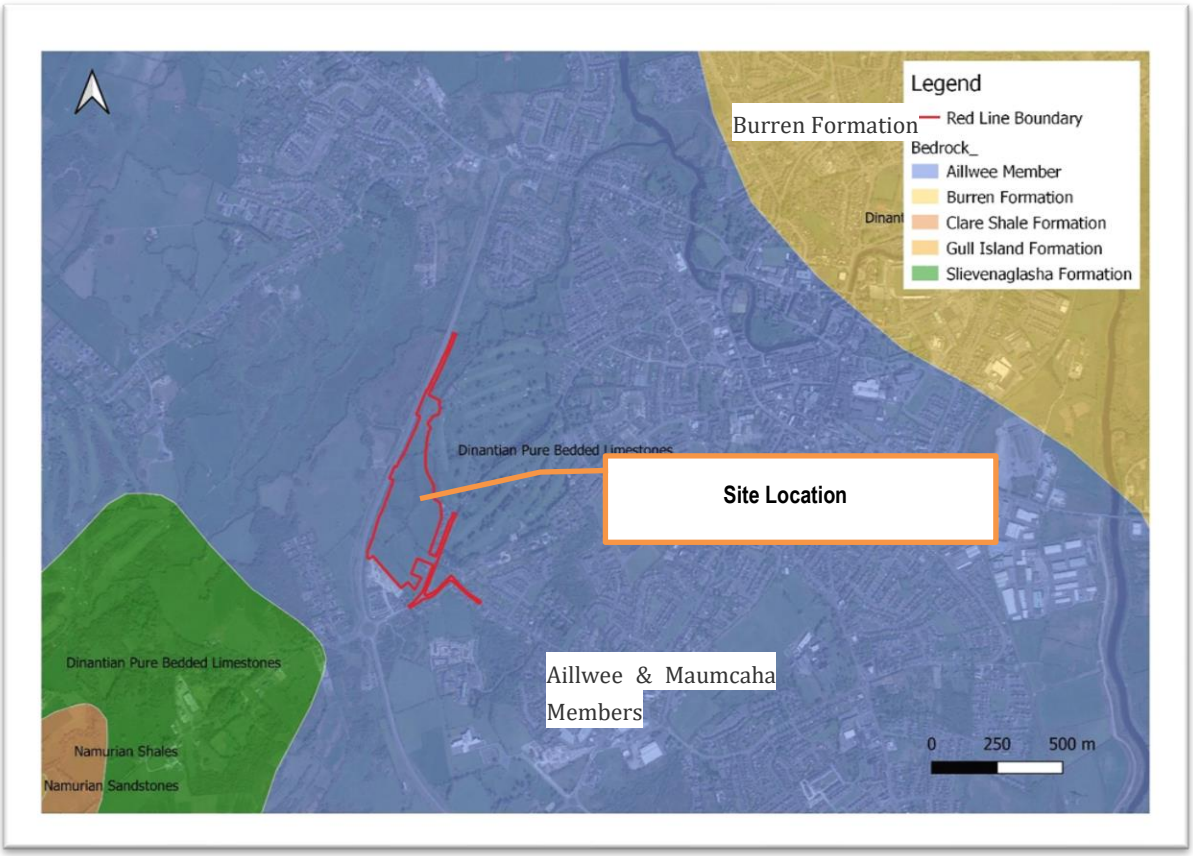

Figure 7.2: Geology Map

Figure 7.3: Geological Heritage Map

7.3.4 Contamination

In 1996 the Environmental Protection Agency (EPA began licencing certain activities in the waste sector. This includes landfills, transfer stations hazardous waste disposal and other significant waste disposal and recovery activities. The EPA website indicated that there are no waste licenced facilities within the general locality around the site. The proposed development is a greenfield site. No Contamination was encountered during the site investigation.

7.3.5 Economic Reserves

There is no loss of mineral geology reserves as the land is located in an urban area and zoned for residential land use.

7.3.6 Characteristics of the Proposed Development

Site development works will include stripping of the 0.3m thick topsoil layer. It is expected that all stripped topsoil will be reused on site (incorporated into landscaping of back gardens and public open spaces).

In order to get sustainable foundation conditions and achieve the requirements of the Design Manual for Urban Roads and Streets some earthworks and cut and fill operation will be required for the development of all areas of the site. Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water. In general, the proposed gradients follow the natural topography of the site. However, a cut and fill operation will be necessary to re-grade certain parts of the site. For instance, grading the internal road network to tie into the link road and raising ends of runs to achieve adequate falls in the drainage network. Underlying subsoil layers generally comprise of gravelly till and are also expected to be suitable for reuse as non-structural fill (e.g., build-up of back gardens areas or build-up of open spaces). The proposed cut fill volumes are outlined in the Construction Waste Management Plan.

A Construction Waste Management Plan (CWMP) has been prepared as part of the Planning Application. The document has been prepared in accordance with the Environmental Protection Agency's Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for construction and demolition projects. The purpose of the Construction Waste Management Plan (CWMP) is to ensure that waste storage and movement within the development takes place in a manner which complies with relevant legislation and has a minimal impact on the nearby existing commercial and residential areas and ensures, where prevention is not possible, that maximum reuse, recycling and recovery of waste with diversion from landfill, wherever possible.

Importation of fill will be required beneath houses, driveways and to roadways (structural fill). Further information regarding importation of fill is included below.

7.4 Predicted Impact Assessment and Determination

7.4.1 'Do Nothing' Scenario

There will be no impact on soils and the geological environment if the development does not proceed as the land will remain in agricultural use and the geological regime will remain unchanged.

Criteria for evaluating impact level are shown in Table 7.1. Terminology for impact significance and duration follows those set out in the NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009).

Table 7.1: Sensitivity of Effects

Sensitivity	Examples
Very High	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource Groundwater which supports river, wetland or surface water body ecosystem protected by EU legislation e.g., SAC or SPA status
High	Contaminated soil on-site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Moderately sized existing quarry or pit Regionally Important Aquifer with multiple wellfields Regionally important potable water source supplying >2,500 homes Inner source protection area for regionally important water source
Moderate	Contaminated soil on-site with previous light industrial usage Small recent landfill site for mixed wastes Small existing quarry or pit sub-economic extractable mineral resource Regionally Important Aquifer Groundwater which provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Large historical and / or recent site for construction and demolition wastes Small historical and / or recent landfill site for construction and demolition wastes

The magnitude of any effects considers the likely scale of the predicted change to the baseline conditions resulting from the predicted effect and takes into account the duration of the effect, i.e., temporary or permanent. Definitions of the magnitude of any effects are provided in Table 7.2 and again are based on the NRA Guidelines (2009).

Table 7.2: Magnitude of Effects

Magnitude	Criteria	Examples
Very High / High adverse	An impact, which obliterates sensitive characteristics of the soil or geology environment	Loss of high proportion of future quarry or pit reserves Removal of entirety of geological heritage feature Requirement to excavate / remediate entire waste site Removal of large proportion of aquifer Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems Potential high risk of pollution to groundwater from routine run-off Calculated risk of serious pollution incident >2% annually
Moderate adverse	Fundamental change to ground conditions, groundwater quality or flow regime	Loss of moderate proportion of future quarry or pit reserves Removal of part of geological heritage feature Requirement to excavate / remediate significant proportion of waste site Removal of moderate proportion of aquifer Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems Potential medium risk of pollution to groundwater from routine run-off Calculated risk of serious pollution incident >1% annually
Low adverse	Measurable change to ground conditions, groundwater quality or flow regime	Loss of small proportion of future quarry or pit reserves Removal of small part of geological heritage feature Removal of small proportion of aquifer Changes to aquifer or unsaturated zone resulting in slight change to water supply springs and wells, river baseflow or ecosystems Potential low risk of pollution to groundwater from routine run-off Calculated risk of serious pollution incident >0.5% annually
Negligible	No measurable effects on ground conditions, groundwater quality or flow	No measurable changes in attributes
Low Beneficial	Minor change to ground conditions, groundwater quality or flow regime	Slight enhancement of geological heritage feature.
Moderate Beneficial	Measurable change to ground conditions, groundwater quality or flow regime	Moderate enhancement of geological heritage feature
High Beneficial	Fundamental change to ground conditions, groundwater quality or flow regime	Major enhancement of geological heritage feature

Effect ratings may have positive, neutral, or negative application where:

- Positive impact – A change which improves the quality of the environment;
- Neutral impact – A change which does not affect the quality of the environment; and
- Negative impact – A change which reduces the quality of the environment.

Terms relating to the duration of effects are as described in the EPA's Guidelines on the Information to be contained in Environmental Impact Statements (2022) as:

- Momentary Effects – Effects lasting from seconds to minutes;
- Brief Effects – Effects lasting less than a day;
- Temporary Effects - lasting one year or less;
- Short-term Effects - lasting one to seven years;

- Medium-term Effects - lasting seven to fifteen years;
- Long-term Effects - lasting fifteen to sixty years;
- Permanent Effects - lasting over sixty years; and
- Reversible Effects – Effects than can be undone, for example through remediation or restoration.

A degree of confidence is assigned to assess the likelihood of an impact occurring (integration of impact characteristics). The following likelihood scale (as defined within the NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)) is referred to:

- Certain/Near Certain: >95% chance of occurring as predicted;
- Probable: 50-95% chance as occurring as predicted;
- Unlikely: 5-50% chance as occurring as predicted; and
- Extremely Unlikely: <5% chance as occurring as predicted.

A qualitative approach was used in the evaluation, following the significance classification in Table 7.1 and through professional judgement. The significance of the effect has been determined through the consideration of the importance/sensitivity of the receptor (attribute) likely to be impacted and the magnitude (the degree or level) of that impact. Effects have been identified as beneficial, adverse or negligible, temporary or permanent and their significance as major, moderate, slight or not significant (negligible) as shown in Table 7.3. Both the adverse and beneficial effects
are considered.

Table 7.3: Effects Matrix

Sensitivity	Magnitude			
	Very High	High	Moderate	Low
Very High	Profound	Profound	Moderate	Low
High	Profound	Moderate	Moderate / Low	Moderate / Slight
Medium	Moderate	Moderate / Low	Moderate / Slight	Slight
Low	Moderate/Low	Slight	Slight	Negligible
Negligible	Slight	Slight	Negligible	Negligible

In order for a potential effect to be realised, three factors must be present. There must be a source or a potential effect, a receptor which can be adversely affected and a pathway or connection which allows the source to effect the receptor. Only when all three factors are present can an effect be realised.

7.3.1 Construction Phase

The potential impact of the proposed development on the land and soils/geology is primary the removal of the topsoil cover, and in some areas the underlying subsoils, down to the required formation level. The excavation work and soil/subsoil removal during the construction phase will create on-site transport requirements and potential on-site sediment management issued in terms of potential dust generation and suspended sediment run off to surface waters.

The nature of the proposed residential development will result in a number of potential direct and indirect construction phase impacts on the geological environment. There are :

- Removal of existing topsoil and subsoil;
- Excavation of some subsoils to achieve the required formation level;
- Fuel spills from construction machinery working on the site or during re-fuelling;
- Uncontrolled sediment runoff.

Geological Heritage, Contamination and Economic resources

There are no Geological heritage sites, contamination sites and economic resources that will be affected by the proposed development

Significance/Sensitivity: Negligible

Description of Impact: Negligible

Hence, the assigned **Significance of effects** is Imperceptible

Stripping of Topsoil

Removal of the existing topsoil layer will be required. As noted previously, it is expected that all stripped topsoil will be reused on site (incorporated into landscaping of back gardens and public open spaces).

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff.

Table 7.4: Estimated Topsoil Volumes

	Volume (m^3)
Topsoil Strip (300mm thick layer)	27,000
Topsoil Reuse (landscaping of open spaces etc.)	27,000

Excavation of Subsoil /weathered bedrock Layers

Excavation of existing subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water.

Underlying subsoil layers generally comprise of brown sandy gravelly SILT or CLAY and are expected to be generally suitable for reuse as non-structural fill (e.g., build-up of back gardens areas or build-up of open spaces).

Table 7.5: Estimated subsoil/reuse Volumes

	Volume (m^3)
Cut	45,000
Reuse of Excavated Material as Non-Structural Fill	45,000

Soil and stone materials imported to site, will be natural stones sourced from locally available quarries, greenfield / inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by- product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

The majority of imported soil replacement materials will be granular in nature and used in the construction of road pavement foundations, drainage and utility bedding and surrounds. Materials will be brought to site and placed in their final position in the shortest possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely co- ordinated to ensure no surplus material is brought to site beyond the engineering requirement.

Table 7.6: Imported Fill

	Volume (m^3)
Fill (Total)	65,000
Reuse of Excavated Material as Non-Structural Fill	45,000
Imported Fill	20,000

Significance/Sensitivity: Negligible

Description of Impact: Negligible

Hence, the assigned **Significance of effects** is Imperceptible.

Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

Any excavations associated with development of the site are expected to be relatively shallow (e.g., no basement construction is proposed) and are not expected to significantly impact on the underlying geology.

Earthworks plant and vehicles delivering construction materials to site (e.g., road aggregates, concrete deliveries etc.) have potential to cause rutting and deterioration of the topsoil layer and any exposed subsoil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network).

Significance/Sensitivity: Low

Description of Impact: Low

Hence, the assigned **Significance of effects** is Not Significant

Operational Phase

On completion of the construction phase, there will be no further impact on soils and the geological environment. In term of land use the change of use will result in less agricultural lands within an urban area. The potential impact is not significant. In relation to topsoil, approximately 8.9 hectares will be removed from agricultural land use. The residentially zoned land will be fenced off and removed from agricultural production from the Construction Phase onwards. The potential loss of agricultural land is considered long term, not significant and certain.

Significance/Sensitivity: Low

Description of Impact: Low

Hence, the assigned **Significance of effects** is Not Significant

7.5 Mitigation Measures

7.5.1 Construction Phase

The mitigation measures proposed for implementation during the construction phase are set out in the Construction and Environmental Management Plan (CEMP) submitted as part of this application.

7.5.1 Construction Phase

<u>Soil/Subsoil management</u>

Stripping of Topsoil

- Stripping of topsoil will be managed with the proposed staging for the development. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil stockpiles will also be located so as not to require double handling.
- Surface water runoff from areas stripped of topsoil will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- On-site settlement ponds will include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

Excavation of Subsoil Layers

- Excavation of existing subsoil layers has been minimised. Cut type earthworks operations will not be required to achieve designed site levels.
- Disturbed subsoil layers will be stabilised as soon as practicable (e.g., backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed will be minimised in order to mitigate against weather effects.

  Stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles. Measures will be implemented to capture and treat sediment laden surface water runoff (e.g., sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

  No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.
- Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site.

Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.

Accidental Spills and Leaks

In order to mitigate against spillages contaminating underlying soils, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).

No mitigation measures are proposed in relation to the geological environment.

7.5.2 Operational Phase

On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment. SuDS measures will be maintained as part of the operational phase.

7.5.3 'Do Nothing' Scenario

No mitigation measures are proposed in relation to soils and the geological environment if the development does not proceed.

7.6 Residual Impact

7.6.1 Construction Phase

Implementation of the measures outlined will ensure that the potential impacts of the proposed development on soils and the geological environment do not occur during the construction phase and that any residual impacts will be short term.

7.6.2 Operational Phase

There are no predicted impacts arising from the operational phase.

7.6.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

7.7 Monitoring

The proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to Construction Environmental Management Plan (CEMP)
- Construction monitoring of the works (e.g., inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring of contractor's stockpile management (e.g., protection of excavated material to be reused as fill)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.) No ongoing monitoring is proposed on completion of the construction phase.

7.8 Potential Cumulative Impacts

A review of Planning applications in the area surrounding the site was undertaken as part of the EIAR assessment. Other developments currently under construction and other committed development in the vicinity of the site have been considered and are also listed in Table 1.2 of the Introduction Chapter of the EIAR and will not result in significant cumulative impacts during the construction or operational phase in relation to soils and geology.

Should the construction phase of any developments coincide with development of the site, potential cumulative impacts are not anticipated once similar ameliorative, remedial and reductive measures are implemented.

7.9 Reinstatement

All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

All construction waste and / unused building materials are to be removed from site on completion of the construction phase.

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.

All sediment control measures (e.g., sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

7.10 Interactions and Potential Cumulative Impacts

Traffic and Transportation

Delivery of materials to site will lead to potential impact on the surrounding road network.

Water and Hydrology

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result subsoil erosion and generation of sediment laden surface water runoff.

Waste Management

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.

Noise and Vibration

Development of the site will result in a level of construction related noise and vibration on sensitive receptors

Air Quality

Dust generation can also occur during dry weather periods as a result of construction traffic.

Biodiversity

Removal of the existing topsoil layer will be required across the site as well as removal of some trees, hedgerows etc.

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

CHAPTER 8

Hydrology and Hydrogeology

August 2022

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CHARTERED PLANNING CONSULTANTS

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8 Hydrology and Hydrogeology

8.1 Introduction

This Chapter presents the assessment of potential significant effects of the proposed housing development on the surface water receiving environment during Construction, Operational Phases. It describes the methodology applied and documents the existing environmental conditions which serves as baseline for the impact assessment. It also identifies suitable mitigation measures and describes the Project's anticipated residual effects.

This Chapter should be read in conjunction with:

- Chapter 2 (Project Description);
- Chapter 9 (Biodiversity); and
- Chapter 7 (Geology, Land and Soils).

This Chapter sets out to describe the potential effects that a housing development may have on the baseline environment in terms of soils, geology and hydrogeology. Within that context, it identifies mitigation measures which can serve to avoid or minimise any adverse effects and documents geological and hydrogeological conditions which can still influence the implementation planning of the Project.

A considerable volume of geological and hydrogeological information was already presented in the 2017 EIAR for the previous planning application (Tobin 2017). This serves as relevant background information for the current EIAR.

8.1.1 Author Information and Competency

John Dillon is Professional Geologist (P.Geo.) and chartered waste manager (MCIWM) in the Energy and Environment section of TOBIN. He holds a degree in Environmental Science from the National University of Ireland, Galway and a Masters in Science in Environmental Engineering from the Imperial College London. John provides project management, project co-ordination and specialist contribution to hydrogeology/hydrological reports for Planning Applications, Environmental Impact Assessment Reports and waste licence applications. John has fifteen years' experience in the areas of environmental management and assessment with particular reference to the transmission line projects, energy projects, hydrogeological projects and public consultation in Ireland and the UK. John has been involved with the waste licence/permit applications, design and planning applications for retail/commercial developments, waste management facilities and quarries nationwide. John has contributed to Screening Reports and Natura Impact Statements for wastewater treatment plants, pipeline projects, solar farm and wind energy developments and has defended Appropriate Assessments at Oral Hearings for waste management facilities and road projects.

Brendan Moloney is Chartered Engineer with over 8 years' experience. He currently holds the position of Senior Engineer / Hydrologist within the company. From his time spent working in the water / wastewater sector coupled with the technical design theory knowledge gained from under-graduate studies Brendan has significant experience of civil engineering design and particularly the water services sector. Brendan has direct responsibility for the completion of site specific flood risk assessments for varying projects including residential developments, solar farm developments, windfarms, care homes etc.

8.2 Methodology

8.2.1 Scope of Assessment

This methodology and scope of assessment considers involved the completion of a Desk Study and Site Walkover and includes the following:

River Flow:

- Effects on (fluvial) flood risk

River Water Quality:

- Effects on the water quality of the Claureen River (Inch River)
- Effects on the WFD status classification of the Claureen/Fergus River

8.2.2 Legislation and Guidance

The impact assessment for the Water chapter for the EIAR has been conducted in the context of the following relevant directives, regulations and guidance:

Directives:

- European Commission (2017) Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).
- European Union (2000/60/EC) Water Framework Directive.
- European Union (2006/188/EC) Groundwater Directive.
- European Union (1992/43/EEC) Habitats Directive.

National Legislation:

- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, with amendments.
- S.I. No. 722 of 2003, European Communities (Water Policy) Regulations.
- S.I. No. 272 of 2009, European Communities Environmental Objectives (Surface Waters) Regulations, with amendments.

Guidance:

- EPA (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022).
- Department of Housing, Planning and Local Government (2018): Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).
- National Roads Authority (NRA) (2009): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

8.2.3 Appraisal Methodology

The appraisal methodology is based on the source-pathway-receptor model of environmental risk assessment. For potential effect to be realised, there must be a source or a cause of effect, a receptor which can be adversely affected, and a pathway or connection which allows the source to affect the receptor.

The appraisal methodology is broadly the same as that presented in Section 7, only the evaluation attributes are different (surface water-related instead of soils, geology and hydrogeology). The rating criteria consider the importance or sensitivity of the receiving surface water(s) of the Project site, and the magnitude of predicted impacts is judged for each attribute considered.

8.2.3.1 Rating Attributes and Magnitude of Effects

A criteria rating scheme which was tailored to the Project site was developed as presented in Table 8.1 and Table 8.2 below. The magnitude of the predicted effect is judged by scale and extent, duration, timing (e.g., seasonality) and frequency (e.g., permanent or seasonal).

Table 8.1: Criteria for Rating Project-specific Receiving Surface Water Attributes

Attribute Importance/ Sensitivity	Criteria	Attributes Considered
Very High	Important at a national or international scale	Receiving water is a designated Protected Area. Receiving water is protected under EU/ Irish legislation (SAC, cSAC, SPA, pSPA, NHA, pNHA. Receiving water is a WFD High Status water body.
High	Important at a national or regional scale	Receiving water is part of a designated Protected Area. Receiving water is a WFD Good Status water body and/or a Good biological quality river (Q4 to Q5). Receiving water is important for social or economic uses, including navigation.
Medium	Important at a regional or local scale	Receiving water is part of a designated Protected Area and may support a small / limited population of protected species. Receiving surface water is a WFD Good or Moderate Status water body where significant pressures are partly or wholly unrelated to the Project site. Receiving water has limited social or economic uses.
Low	Important at a local scale	Receiving water is not part of or is far removed (>5 km) from, a downstream, designated Protected Area. Thus, receiving water has no specific conservation requirements. Receiving surface water is a WFD Moderate or Poor Status water body where significant pressures are partly or wholly unrelated to the Project site.
Negligible	Important at a local scale	Receiving water is not part of or is far removed (>5 km) from, a downstream, designated Protected Area. Receiving water has naturally low aquatic fauna and flora biodiversity. Receiving water has minimal importance for social or economic uses.

Table 8.2: Criteria for Estimating Description of Impact on Receiving Surface Water Attributes

Description of Impact	Criteria	Attributes Considered
High	Adverse: Results in loss of attribute and/or quality and integrity of attribute	Loss of or extensive change to a designated Protected Area, including the conservation objectives of a designated water-dependent SAC/SPA. Loss of fishery production. Significantly reduces streamflow conditions. Significantly alters river morphology. Causes deterioration of WFD status, especially failure to meet Good status objectives. Induces a negative chemical quality trend. Calculated risk of serious pollution incident >2% annually.1 Effects cannot be mitigated.
Medium	**Adverse:** Results in effect on integrity of attribute or loss of part of attribute	Manageable change to a designated Protected Area Manageable change to streamflow conditions. Some alteration to river morphology. May cause a deterioration of WFD water body status or may prevent improvement in WFD status. May induce a negative chemical quality trend. Calculated risk of serious pollution incident >1% annually.[1] Effects can be mitigated.
Low	**Adverse:** Results in a manageable effect on integrity of attribute or loss of part of attribute	Small measurable and acceptable loss of streamflow. Alteration to river morphology is minor and acceptable. Unlikely to cause a change to WFD water body status Unlikely to cause a negative chemical quality trend. Effects can be mitigated.
Negligible	Imperceptible alteration to one or more characteristics, features or elements of attribute	No measurable effect on receiving surface water body Calculated risk of serious pollution incident <0.5%.[1]
Low Positive	**Beneficial:** Results in some positive effect on attribute or a reduced risk of negative effect occurring	Maintains Protected Area environmental requirements. Maintains WFD water body status. May contribute to reversing a negative chemical quality trend.
Medium Positive	**Beneficial:** Results in moderate improvement in attribute quality integrity	Maintains or is likely to meet Protected Area environmental requirements. Maintains WFD water body status and may improve a "less than Good" status classification. Activity improves river morphological conditions.
High Positive	**Beneficial:** Results in major improvement in quality and integrity of attribute	Results in Protected Area environmental requirements being met (when they previously did not do so). Helps achieve a WFD High or Good status objective. Reverses a negative chemical quality trend. Activity significantly improves river morphological conditions.

Notes: [1] Based on NRA guidelines (2009)

With reference to Tables 8.1 and 8.2, designated Protected Areas are:

- Bathing Waters
- Shellfish Waters
- Salmonid Waters
- Freshwater Pearl Mussel Waters
- Nutrient Sensitive Areas
- European (Natura) Sites
- Drinking Water Protected Areas

Protected Areas have environmental requirements which are stipulated in Protected Area regulations, as follows:

- Bathing Water Quality Regulations 2008, S.I. No. 79 of 2008, as amended
- Quality of Shellfish Waters Regulations 2006, as amended
- Salmonid Regulations, S.I. No. 293 of 1998, as amended
- Freshwater Pearl Mussel Regulations, S.I. No. 296 of 2009
- Urban Wastewater Treatment Regulations S.I. No. 208/1999, as amended
- Birds and Natural Habitats Regulations, S.I. No. 477 of 2011, as amended
- Drinking Water (No. 2) Regulations, S.I. No. 278 of 2007, as amended

8.2.3.2 Judging the Significance of Effects

The significance of a predicted effect is determined from the Significance/Sensitivity and the assigned magnitude of effects using the matrix provided in Figure 8.1.

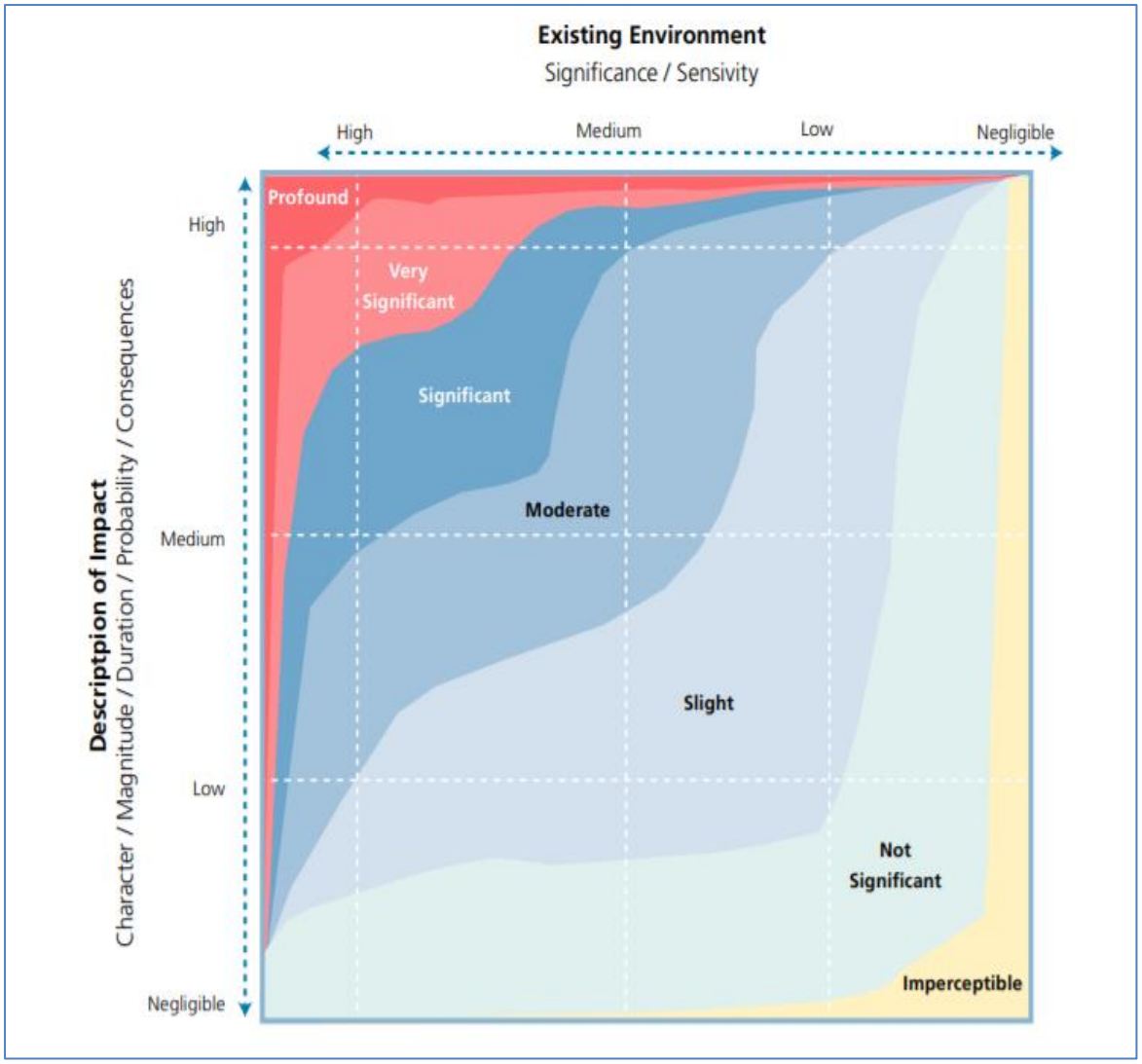

Figure 8.1: Significance/Magnitude Matrix

8.2.4 Desk Study

A desk study was undertaken as part of the characterisation of baseline conditions. This involved an examination of past reports and publicly available sources of information that include the resources listed in Appendix D of the IGI guidance (IGI 2013). Specific reports from the Proposed development which are of immediate relevance to this Chapter are:

- GII report (2021). Site investigation report

8.2.5 Difficulties Encountered in Compiling Information

No significant constraints were encountered during the compilation of this Chapter. A robust evaluation of the likely significant effects of the Project has, therefore, been undertaken for the purpose of preparing this Chapter.

8.2.6 Worst Case Scenario

The 'worst case scenario' has been considered in assessing the likely significant effects of available ranges of options or design parameters.

Where a worst case scenario has been assessed in this Chapter, details are provided outlining the maximum dimensions or volumes associated with particular activities, the maximum emissions predicted, and the range of technologies and processes anticipated to be employed.

8.3 Description of existing Environment

The detailed description of the proposed development and construction activities are provided in Chapter 1 (Introduction) and Chapter 2, (Project Description). The details of the sites proposed connectivity to the existing water supply network, waste water and drainage infrastructure are presented in Chapter 6 Material Assets (Services, Infrastructure and Utilities).

8.3.1 Receiving Surface Waters

The proposed development at Circular Road, Ennis is located approximately 1.6km from Ennis town centre , on agricultural lands within the development boundary of the town.

The site is a gently undulating site comprised of open field and encroaching scrub from overgrown/rank hedgerows. Figure 8.2 and Figure 8.3 show the existing site layout.

Figure 8.2: Site Photo Facing North

Figure 8.3: Hedgerows Within the Site

Two streams are located in the surrounding area see Figure 8.4:

- Fergus River, which is located 2km northeast and east of the Project location.
- Claureen River, which is a tributary of the Fergus River 0.4km west of the Project location.

Surface water drainage comprises the Claureen River which runs to the northwest of the northern development site boundary, and which generally flows in a NE direction. The river is also known as the Inch River (EPA name, 2022) and converges with the river Fergus farther to the NE which in turn ultimately discharges into the Fergus and Shannon Estuary.

Regional and local hydrology is intrinsically connected to the hydrogeological setting within the greater development area.

According to the EPA (2021) on-line mapping, the proposed development site lies within the Shannon Estuary North Catchment (Hydrometric Area No. 27) and the River Fergus sub-catchment – Fergus_060, See Figure 8.4. While the greater area contains several karst features, there are no known karst features on site.

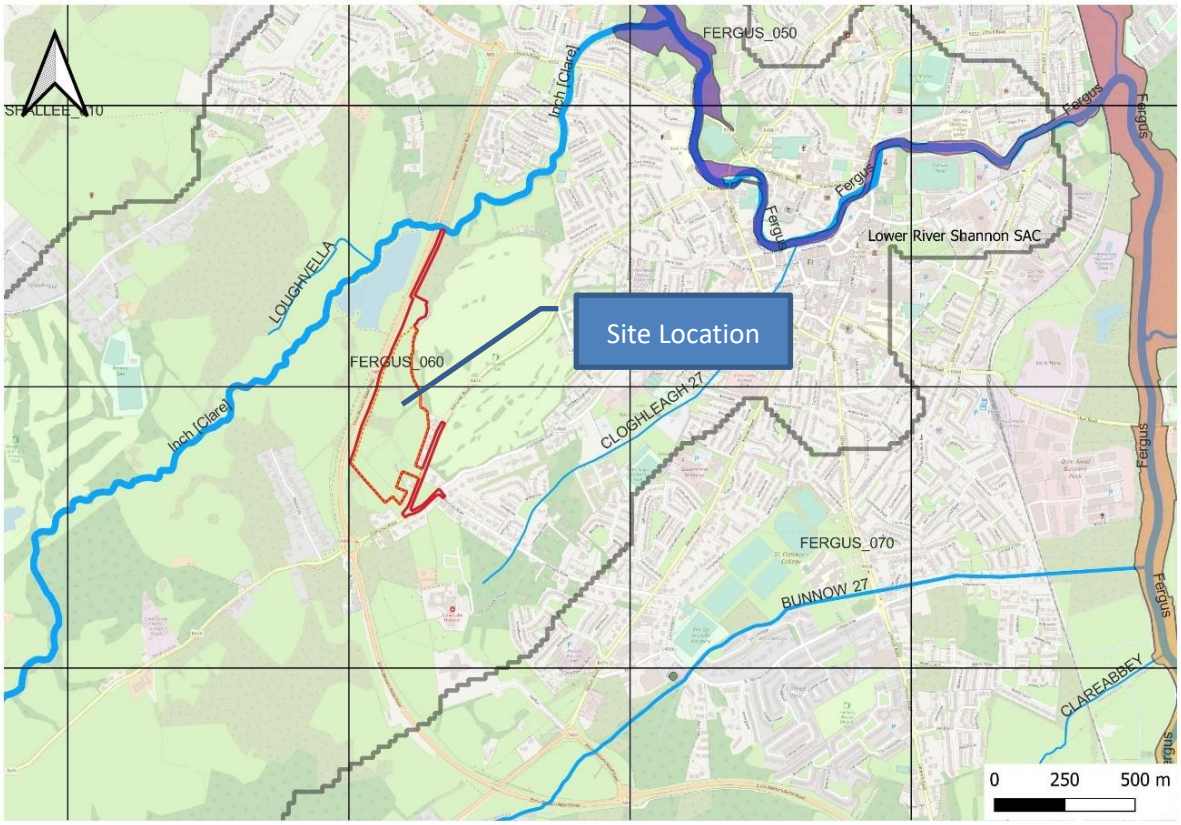

Figure 8.4: Surface Water Features and Sub-Catchments

The Claureen River is the closest surface water body to the proposed development. Prior to development, the Ordnance Survey Ireland (OSI) six-inch to 1-mile scale field sheets indicate that there were no natural surface water streams within the site. The site slopes towards the Claureen River.

8.3.2 Designated Protected Areas

The nearest relevant Protected Areas downstream of the site are:

- Drinking Water Protected Area – Drumcliffe Source and Source Protection zone.
- Natura Site: Lower River Shannon SAC, which the Fergus River flows into at a location just downstream of Claureen Bridge in Ennis, 2 km (straight line) to the north of proposed development. Although the Claureen River is not a designated Salmonid Water, the tidal section of the river Fergus downgradient is a Salmonid River.

There are no protected Bathing Waters, Shellfish Waters, Freshwater Pearl Mussel Waters, Nutrient Sensitive Areas or Drinking Water Protected Areas downgradient of the site.

8.3.2.1 EPA/GSI Source Protection Zones

As reported by the *EPA* and *GSI*, groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. Consequently, the objective of source protection zones is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source.

There are two main elements to source protection land surface zoning:

- Areas surrounding individual groundwater sources; these are termed source protection areas (SPAs)
- Division of the SPAs on the basis of the vulnerability of the underlying groundwater to contamination.

These elements are integrated to give the source protection zones.

Two source protection areas are recommended for delineation:

Inner Protection Area (SI). This area is designed to protect against the effects of human activities that might have an immediate effect on the source and, in particular, against microbial pollution. The area is defined by a 100-dat time of travel (TOT) from any point below the water table to the source. In karst areas, it will not usually be feasible to delineate 100-day TOT boundaries, as there are large variations in permeability, high flow velocities and a low level of predictability. In these areas, the total catchment area of the source will frequently be classed as SI.;

Outer Protection Area (SO), encompassing the remainder of the groundwater source catchment area or ZOC. It is defined as the area needed to support an abstraction from long-term groundwater recharge i.e., the proportion of effective rainfall that infiltrates to the water table.

According to the *GSI/EPA* Source Protection Zone Map (www.epa.ie), the site is not located within the Inner Source Protection Zone of the Drumcliff Spring Catchment, which supplies the public drinking water for the town of Ennis, Co. Clare. The delineated Source Protection Zone is shown on Figure 8.5. Based on the SPZ and site investigation works, there is no direct link between the proposed development and the Drumcliff Spring. No major conduits/faults were detected in the site.

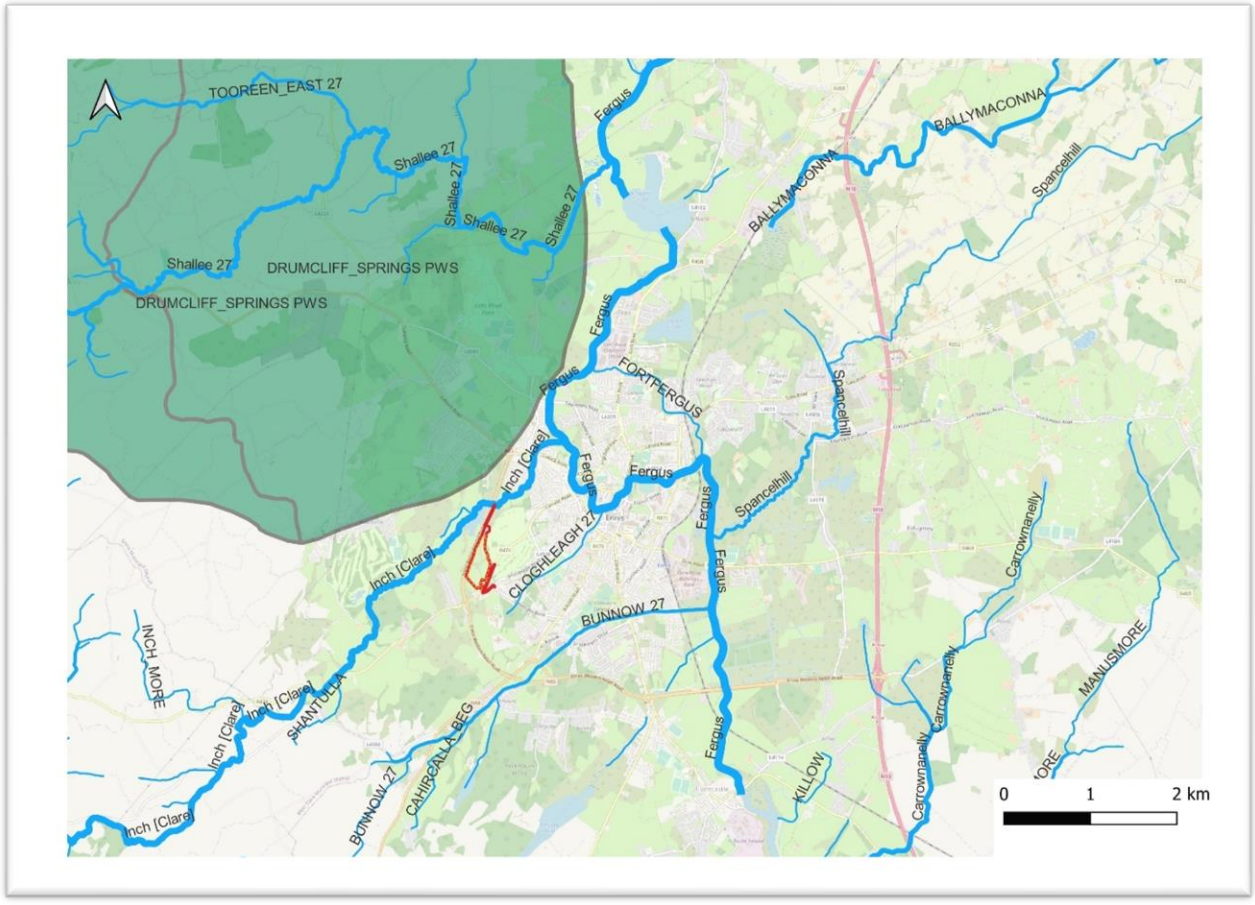

Figure 8.5: Drumcliff SPZ Figure

8.3.3 Claureen River - WFD Status

The Claureen River which flows out of proposed development is part of the larger Fergus River, which in turn is part of the Shannon Estuary North catchment. For WFD reporting purposes, the EPA refers to the subcatchment of the Claureen River as the "Fergus_060" water body. The Fergus_060 subcatchment also incorporates other tributaries.

Heavy siltation was identified within Fergus_060 with channelisation and combined sewer outflows identified as significant pressures. Channelisation and embankment are impacting the Fergus_070, a heavily modified water body.

According to EPA's latest WFD status classification for the period 2013-2018, the section of the Claureen River to the west of the proposed development is at "Moderate ecological status", Based on information provided by EPA for the "Fergus_060" subcatchment, the main cause of the "Poor ecological status" classification is "Poor invertebrate status".

The latest available EPA biological Q-value for macroinvertebrates was 3 ("moderately polluted, unsatisfactory condition") in 2019 at a location 1km just downstream of the landholding at Claureen Bridge. Nutrient conditions at Claureen Bridge are within the WFD limits in terms of Ammonium, Total Oxidisable Nitrogen and Orthophosphate. Station 0540 recorded an improvement to Moderate ecological quality from Poor status in 2020.

EPA's latest available local catchment assessment report for the "Fergus_060" subcatchment (EPA 2019) identifies the following significant pressures in the subcatchment:

- Urban runoff
- Hydromorphology (channelisation and embankment)

The "Fergus_060" water body is "At Risk" of meeting the WFD good status objective in 2027.

The nearest routine EPA water quality monitoring station on the Claureen River is at Claureen Bridge. The station is part of EPA's WFD operational monitoring network for rivers, and is downstream of the site, suburban areas as well as agricultural lands.

8.3.4 Flooding

TOBIN Consulting Engineers undertook a Flood Risk Assessment (FRA) for their lands and proposed residential development at Drumbiggle in Ennis, Co. Clare. The greenfield site is located approximately 2km southwest of the town centre, alongside Ennis Golf Club and the N85, adjacent to the River Claureen (also known as the River Inch).

Existing ground levels are approximately 5mOD at the northern redline boundary at the River Claureen, with levels within the developable area ranging from approximately 13.4mOD at the northeastern corner to approximately 31.2mOD at the southwestern corner.

The PSFRM Guidelines classify residential development as "highly vulnerable" in terms of its sensitivity to flooding. Such developments should be constructed in Flood Zone C, where there is less than a 0.1% Annual Exceedance Probability (AEP) of fluvial, pluvial, groundwater and coastal flooding. Based on the results of the Clare Strategic Flood Risk Assessment, and OPW modelling (PFRA, CFRAM) the developable area is located outside the predicted flood extents of the Claureen River.

A drainage impact assessment was undertaken by Tobin Consulting Engineers as part of the project. This report deals with the following aspects associated with this development:

- Existing Site and Hydrological Features
- Site Investigation Testing
- Soil Type Classification
- Storm Water Drainage Design
- Sustainable urban Drainage Systems (SuDS)
- Flood Risk Assessment and Exceedance Flows
- SuDS Maintenance

Based on the results of the Drainage impact Assessment by TOBIN, the Clare Strategic Flood Risk Assessment, and OPW modelling (PFRA, CFRAM) the developable area is located outside the predicted flood extents of the Claureen River and the proposed drainage is considered 'appropriate' in line with the PSFRM and SuDS Guidelines.

8.4 Predicted Impact of the Project

Infill Material will be imported on-site. This material will be either quarried product from quarries that have planning permission; greenfield/inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

It is proposed to use a Sustainable Urban Drainage Systems, (SuDS) approach to surface water management throughout the site. This overall strategy aims to provide an effective system to mitigate the adverse effect of stormwater runoff on the environment by reducing runoff rates, volumes and frequency, and reducing pollutant concentrations in surface water and emulate the greenfield runoff rate. The proposed SuDS features in the development are permeable paving on driveways, cellular underground soakaways, bioswales, petrol interceptors and a hydro brake flow control.

Energy from inflowing stormwater as it enters the pond is absorbed by the water already in the pond, thus inflowing water does not cause erosion of materials at the base of the pond. Detention ponds also provide water quantity control as they retain the runoff and release it into watercourses at a pre-development flow rate.

The storm drainage has been designed using the 100-year return period plus an additional 20% to account for the effects of climate change.

8.4.1 Do Nothing Scenario

In the Do Nothing scenario, housing development does not occur. In this case, there are no further or likely significant effects arising to receiving waters. Agricultural activity would remain and contribute to the baseline water quality and flow.

8.4.2 Construction Phase

8.4.2.1 Water Quality

(I) Hydrocarbons

Risk of impact to the Claureen River during construction is temporary and can be managed by way of establishing suitable water management and sediment control practices (Section 8.6 of this chapter).

Significance/Sensitivity: Low

Description of Impact: Brief to Short Term, Unlikely and indirect.

Hence, the assigned Significance of effects is Slight.

(II) Sediment

The construction works may release sediment/organic matter to the local surface drains. This can affect the water chemistry of the Claureen River. It is a temporary to short-term effect, localised and water management measures can be implemented to mitigate potential effects (Section 8.6 of this chapter).

Significance/Sensitivity: Low

Description of Impact: Brief to Short Term, Unlikely and indirect.

Hence, the assigned Significance of effects is Imperceptible.

Excavation activity and associated earthworks may release organic matter and sediments into the drainage network around the proposed development. The existing drainage will only be impacted in areas where construction occurs. The drained water will be directed to new SuDS measures followed by detention pond before water is further conveyed via a bioswale to the Claureen River. There are

no surface water abstractions within the site. The river is at Moderate status and is affected by hydromorphology pressures and urban wastewater discharges further downstream.

Construction activity can lead to accidental spills of chemicals and fuels which can affect surface water quality. This is temporary and risks are manageable by following standard best construction practices (Section 8.6 of this chapter).

Significance/Sensitivity: Low

Description of Impact: Brief to Short Term, unlikely and indirect.

Hence, the assigned Significance of effects is Imperceptible.

(III) Flow

The subject site is located within the Claureen River catchment, and generated runoff will be discharged at greenfield runoff rates to the stormwater outfall downstream of the N85 bridge. The developable area and open attenuation pond are located outside the predicted flood extents of the Claureen River.

The storm drainage has been designed using the 100-year return period plus an additional 20% to account for the effects of climate change.

Significance/Sensitivity: Medium

Description of Impact: Low/Negligible, Short Term

Hence, the assigned Significance of effects is Imperceptible.

(IV) Flooding

The subject site is located within the Claureen River catchment, and generated runoff will be discharged at greenfield runoff rates to the stormwater outfall downstream of the N85 bridge. The developable area and open attenuation pond are located outside the predicted flood extents of the Claureen River. All works within the floodplain are drainage associated, and will not impact existing ground levels, fluvial flow routes or floodplain storage. Therefore, it is estimated that risk of fluvial flooding associated with the proposed development is minimal.

Significance/Sensitivity: High

Description of Impact: Negligible, short term, unlikely

Hence, the assigned Significance of effects is Imperceptible.

8.4.3 Operations Phase

The storm drainage may potentially release sediment and potential pollutants to the local drainage channels. Such constituents can affect the water chemistry of the Claureen River. This is a long-term risk, but water management measures can be established to mitigate potential effects (Section 8.6).

There are no surface water abstractions within 5 km of the site and the site is not located downgradient. The river is at Poor/Moderate status and is affected by urban wastewater discharges further downstream.

Significance/Sensitivity: Low

Description of Impact: Low/Negligible, long term, unlikely

Hence, the assigned Significance of effects is Imperceptible.

Because the drainage is contained and treated, the Claureen River will not be during operations.

Significance/Sensitivity: Low

Description of Impact: Low/Negligible, long term, unlikely

During operational phase, there will be a minor reduction in recharge to groundwater and a minor increase to the surface water environment, as rainwater falling on areas will be diverted to the drainage network. This change is negligible when compared to the flow in the Claureen River.

Significance/Sensitivity: Low

Description of Impact: Negligible

Hence, Significance of effects is Imperceptible.

Operational activity can result in accidental spills which, like the construction phase, can result in temporary to short-term impacts to surface water. Repeated offences could cause cumulative effects but associated risks of spills are manageable by following standard best operational practices (Section 8.6).

Significance/Sensitivity: Low

Description of Impact: Low/Negligible, long term, unlikely

Hence, Significance of effects is Imperceptible.

8.5 Mitigation and Monitoring

8.5.1 Do Nothing Scenario

In the Do Nothing Scenario, there are no further effects to receiving waters, and further mitigation measures are not required.

8.5.2 Construction Phase

The use of plant and machinery during construction works will require the storage and use of fuels and oils. Any servicing of vehicles on-site will be confined to designated areas. Spill kits will be retained on-site to ensure that all spillages or leakages are dealt with immediately and staff will be trained in their proper use. Storage tanks, used to store fuel for plant and machinery, will be self-contained, bunded, and double-walled. Refuelling plant and equipment will be carried out from these tanks or from delivery vehicles at designated refuelling areas. The design of all bunds will conform to EPA bunding specifications. Details of spill protection measures and emergency spill response procedures are included in the Construction and Environmental Management Plan (CEMP) submitted as part of this application.

Programming of works will need to be such that earthworks are not scheduled during severe (wet) weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

Construction activities will be confined to the footprint of the development site.

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment.

- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Weather conditions will also be taken account of when planning stripping of topsoil and excavations with an objective of minimising soil erosion.
- In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).

- Concrete batching will take place off site and wash down and wash out of concrete trucks will take place off site (at authorised concrete batching plant in full compliance with relevant planning and environmental consents).
- Discharge from any vehicle wheel wash areas will be directed to on-site settlement ponds.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply will be protected from contamination by any construction activities or materials.
- Water sediment and colour will be monitored extensively during construction. Trigger values will be established to shut works down, namely 25mg/l Total Suspended Solids.

The division of work areas in phases (outlined Chapter 7 - Geology, Land and Soils) reduces the areas of exposed soil materials at any given time, which reduces the likelihood or risk of sediment mobilization and transport further.

Water intercepted from constructed roads and hardstanding areas will be similarly managed to ensure that uncontrolled water discharges do not take place to the receiving environment.

Stormwater collected in this manner will be diverted through a sediment grit trap and oil interceptor, prior to discharge to the settling ponds. Construction vehicles leaving the site will pass through a wheel wash, to ensure that debris and soil from the site do not impact on the roads.

All imported soils and stones shall be sourced from a licenced/permitted facility with suitable documentation to confirm the material is inert and fit for purpose. The contractor shall ensure the material is fit for use before importing to the site.

8.5.3 Operations Phase

The design of proposed site levels (roads, FFL etc.) has been carried out to ensure the proposed development is elevated and set in such a way as to avoid concentrating additional surface water flow in a particular location.

Following the Site Specific Flood Risk Assessment, it has been determined that the site / zoned developable area is located in Flood Zone C as defined by the Guidelines. No proposed dwellings are located in Flood Zone A or B Surface water runoff from the site will be attenuated to the greenfield runoff rate. Surface water discharge rates will be controlled by a Hydrobrake type vortex control device in conjunction with below ground attenuation storage. There are four critical objectives that SuDS seek to meet:

- Quantity: managing flows and volumes to match the rainfall characteristics before development.
- Amenity: integrated design that provides useful and attractive multifunctional spaces.
- Quality: preventing and treating pollution to ensure that clean water is available as soon as possible to provide amenity and biodiversity benefits and protecting watercourses and groundwater.
- Biodiversity: maximising the potential for wildlife through design and management of SuDS.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving in driveway areas
- Surface water runoff from roofs will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways
- Attenuation of the 30 and 100 year return period storms
- Installation of a Hydrobrake

- Surface water discharge will also pass via a fuel / oil separator (sized in accordance with permitted discharge from the site) A contract will be entered into with a suitably qualified contractor from maintenance of the attenuation system, Hydrobrake and full retention fuel / oil separator noted above.
- Bioswale following discharge from the final settlement pond

All new foul drainage lines will be pressure tested and be subject to a CCTV survey in order to identify any possible defects prior to being made operational. No specific mitigation measures are proposed in relation to water supply. Water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.

It is proposed to use a Sustainable Urban Drainage Systems, (SuDS) approach to surface water management throughout the site. This overall strategy aims to provide an effective system to mitigate the adverse effect of stormwater runoff on the environment by reducing runoff rates, volumes and frequency, and reducing pollutant concentrations in surface water and emulate the greenfield runoff rate. The proposed SuDS features in the development are permeable paving on driveways, cellular underground soakaways, petrol interceptors and a hydro brake flow control.

The proposed surface water drainage network has been designed into 7No. catchment areas for the development. The surface water will flow to soakaways for 6 of the catchment areas and to a detention pond for the northernmost catchment area. The soakaways and the detention pond have been designed to a cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

The soakaways have been designed using infiltration rates form a Site Investigation carried out by Grounds Investigation Ireland (see appendix 6.1 of this EIAR). The infiltration rates were obtained by Soakaway Testing to BRE Digest 365. A conventional infiltration rate for each soakaway was used in the design and a factor of safety of 2. The surface water in each soakaway will infiltrate to the ground, as it would naturally in a green field site. Prior to entering each soakaway, the surface water will flow through petrol interceptors to remove any hydrocarbons the water may contain.

The pond has been designed to cater for the catchment area and the overflows from each of the soakaways if needed. The pond is relatively shallow at 1.5m, designed with 4No. step formations at a 1/4 slope. Refer to engineers drawing for details.

The detention pond provides several forms of treatment to the collected water within it. As a result of the size of the pond, much of the bacteria and pollutants that enter the pond settle over time prior to reaching the outfall pipe. Furthermore, retention ponds can support vegetation and plant life, which provide further pollutant treatment and removal. The plants absorb dissolved pollutants and convert them into less harmful materials. Microorganisms present in the pond can further treat and breakdown pollutants that include bacteria, nitrogen, phosphorus, total suspended solids, oil and particulate matter from vehicles.

Surface water from the retention pond shall discharge into the Claureen River via a hydro brake manhole, which will limit the amount of water discharging to the river. The amount of water discharging will be under the allowable Greenfield Runoff rate, which has been calculated at 17.8 l/s due to the developable area of the site. The surface water will flow through a bar screen at either end of the outfall pipe which will mitigate against debris/litter entering the Claureen River. The outfall from the retention pond will run along the corridor adjacent to the N85 route via a bioswale further improving water quality.

8.6 Residual Impacts

The nature of the development dictates that the greatest potential impact on the underlying hydrogeology associated with the proposed development will be in the operational phase. It is predicted that the impacts to the hydrogeological and hydrological environments associated with the construction phase of the development will be imperceptible and short term. With regard to the

operational phase of the development, although the discharge of pollutants from runoff to the aquifer could pose a potential risk to groundwater, the proposed drainage system design in conjunction with natural subsoil protection of the sand and gravel aquifer across the site will ensure that no significant impacts on the local hydrogeological geological environment are predicted

8.7 Monitoring

All surface water drainage works will be approved by Clare County Council, Sanitary Services Division, and will be carried out in accordance with the Code of Practice for Drainage Works. Foul and water works will be carried out in accordance with Irish Water latest Codes of Practice. During construction daily inspections of the site drain shall be undertaken.

8.7.1 Oil/Petrol Interceptor

Petrol Interceptor requires periodic inspection and removal of the separated oils and petrol residues to ensure it continues to operate effectively. Safe access must be provided for the provision of maintenance to the petrol interceptor.

8.7.2 Soakaway

Soakaways are designed to allow storm water to permeate through to the ground, periodic inspections are required to ensure that the water is draining freely through the system and that it has not been impacted by silts and other debris which may reduce the permeability of the soakaway. Any build-up of silts should be removed during dry weather conditions.

8.7.3 Infiltration Basin

Infiltration Basins can also be affected by silts and debris if not maintained. This reduces the permeability of the basin and could cause overflow in storm conditions if not properly maintained along with the inflow and discharge pipes which must be inspected to ensure there are no obstructions.

8.8 Interactions

The potential for interrelationships arises with the environmental topic of biodiversity. Soils, geology and hydrogeology have an important interrelationship with the water and ecological environment, as a determinant of water chemistry, river flow regimes, water storage capacity and watercourse location. It also has an impact on water quality through the ability of bedrock and surface deposits to filter potential pollutants. Potential ecological impacts could occur through the mishandling of soils or through the deposition of excavated soils in ecologically sensitive areas.

Any potential impacts have been identified in Section 8.4 and mitigation measures have been proposed in Section 8.5. An evaluation was undertaken based on the identification of potential sources, pathways and receptors across the site. If all three elements (source, pathway and receptor) are present, there is a linkage and there is a potential impact to the receptor(s). In terms of groundwater, hydrology and ecology, there are no groundwater dependent terrestrial ecosystems (GWDTE) receptors downgradient or in close proximity to the site. Therefore, without an environmental receptor being present, the risk is considered to be low.

During construction the potential impacts to the underlying groundwater aquifer from the proposed works could derive from accidental spillages of fuels, which could impact on groundwater quality, if allowed to infiltrate to groundwater.

As described in the application of the identified mitigation measures for the predicted impact on the hydrogeological and hydrological environments will ensure that the residual impact, although long-term will be imperceptible

8.9 References

EPA (2019). Local Catchment Assessment: WFD Cycle 3 Catchment Fergus Subcatchment Fergus_SC_060. Accessible from: https://catchments.ie/wp-content/files/subcatchmentassessments/14_3%20Fergus_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf

Quinlan, C. and R. Quinn (2018). – Characterising Environmental Flows in Ireland and What This Means for Water Resource Management in Ireland. Irish National Hydrology Conference 2018. Accessible from: https://hydrologyireland.ie/wp-content/uploads/2018/11/05-Quinlan-C-Characterising-environmental-flows-in-Ireland.pdf

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

List of Chapters

CHAPTER 9

Biodiversity

August 2022

Glenveagh
Home of the new.

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CHARTERED PLANNING CONSULTANTS

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Biodiversity

Introduction

Enviroguide Consulting was commissioned by Glenveagh Homes Ltd. to prepare a Biodiversity Chapter for a Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare.

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the baseline biodiversity of the Site of the Proposed Development and surrounding environs, with emphasis on habitats, flora and fauna, and details the methodology of assessment used in each case. Likely significant impacts arising from the Proposed Development are identified and an assessment of the predicted effects are outlined. The assessment considers both habitats and species, particularly those protected by national and international legislation, or considered to be of particular conservation importance. Where required, mitigation measures to avoid, minimise and, if possible, offset any significant negative effects are proposed. A description of residual effects that will remain following the implementation of mitigation is also outlined in this Chapter.

Author Information and Competency

Synergy Environmental Ltd., T/A Enviroguide Consulting, is wholly Irish Owned multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All Enviroguide consultants carry scientific or engineering qualifications and have a wealth of experience working within the Environmental Consultancy sectors, having undergone extensive training and continued professional development.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation. Enviroguide staff members are highly qualified in their field. Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. Aisling Walsh, Professional Bat Ecologist with Ash Ecology and Bat specialist Dr Tina Aughney (Bat Eco Services) undertook the bat surveys for this report. Enviroguide Ornithologist Brian McCluskey undertook the breeding bird surveys for this report. Shannen O'Brien, Ecologist with Enviroguide Consulting undertook the remaining ecological surveys and desktop research for this report.

Aisling Walsh is a Professional Ecologist and director of Ash Ecology Consulting. Aisling has a wealth of academic qualification having studied a MSc in Biodiversity and Conservation (TCD), A BSc (Hons) Zoology (NUIG), a Diploma in Applied Aquatic Sciences (GMIT), a Post Graduate Diploma in Statistics (TCD), and a Certificate in Environmental Noise (Institute of Acoustics); while also holding a full membership of the Chartered Institute of Ecology and Environmental Management (CIEEM). Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statement, Environmental Impact Assessments/Statements, Badger Surveys, Bat Surveys, Habitat Surveys. She has also provided input and reviewed Ecological and Environmental assessments for several EIS and EIA Reports and conducted numerous noise surveys for EPA licensed facilities. AEE is listed as a Registered Practice by the CIEEM.

Dr Tina Aughney has worked as a Bat Specialist since 2000 and has undertaken extensive survey work for all Irish bat species including large scale development projects, road schemes, residential developments, wind farm developments and smaller projects in relation to building renovation or habitat enhancement. She is a monitoring co-ordinator and trainer for Bat Conservation Ireland. She is a co-author of the 2014 publication Irish Bats in the 21st Century. This book received the 2015 CIEEM award for Information Sharing. Dr Aughney is a contributing author for the Atlas of Mammals in Ireland 2010-2015.

Brian McCloskey, graduate Ecologist and experienced Ornithologist, has 11 years surveying experience and is a longstanding and active member of Bird Watch Ireland. Brian has provided a range of Ornithology survey work for ecological consultancies, e.g., Vantage points surveys of Gulls, Terns, Raptors, Waders and Wildfowl; hinterland surveys of the above as well as riverine species; and breeding waders and country birds. Brian is highly experienced with all survey methodologies and with surveying all species groups of Irish birds and migrants.

Shannen O'Brien has a B.A. in Zoology from Trinity College Dublin and a M.Sc. Hons. in Wildlife Conservation and Management from University College Dublin, and has experience in desktop research, report writing, and literature scoping-review, as well as practical field and laboratory experience (Pollinator surveying, sampling and identification, habitat surveying, invasive species surveying, etc.). Shannen has prepared Stage I and Stage II Appropriate Assessment Reports, Invasive Species Surveys, Ecology Statements, and Ecological Impact Assessments (EcIA).

Reference to Guidelines Relevant to Discipline

Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester, UK. CIEEM. (2018).

Advice Notes for Preparing Environmental Impact Statements (Draft) Environmental Protection Agency. (2015).

Guidelines on the information to be contained in Environmental Impact Assessment Reports. Published by the Environmental Protection Agency, Ireland. Environmental Protection Agency. (2022).

Environmental Assessment and Construction Guidelines. National Roads Authority (now Transport Infrastructure Ireland), Dublin. NRA. (2009).

Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority (now Transport Infrastructure Ireland), Dublin. NRA. (2009).

Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads(now Transport Infrastructure Ireland), Dublin. NRA. (2010).

Best practice guidance for habitat survey and mapping. The Heritage Council, Kilkenny. Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011).

Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. Inland Fisheries Ireland. (2016).

National Legislation

Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. With regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all wild birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The current list of plant species protected by Section 21 of the Wildlife Act, 1976 (and amendments) is set out in the Flora (Protection) Order, 2015 (S.I. No. 356/2015). The Flora (Protection) Order affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regards to the listed species, "Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence."

Invasive Species Legislation

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the Regulations are reproduced below.

"49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht]*, any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace* [a restricted non-native plant]*, shall be guilty of an offence.*

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she […] offers or exposes for sale, transportation, distribution, introduction, or release—

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,

(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or

(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material."

International Legislation

EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and

for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 165 Special Protection Areas have been designated.

EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approximately 1000 species throughout Europe. The habitats and species are listed in the Directives annexes, where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000.

Water Framework Directive

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, the second cycle ran from 2016 – 2021, and the current (third) cycle runs from 2022-2027.The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' status, through River Basin Management Plans (RBMP), by 2027.

Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced to give protection to migratory species across borders in Europe.

Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994 Ha.

Clare County Council Development Plan

Policies and objectives within the Clare County Council Development Plan 2017-2023 that are relevant to the Proposed Development are outlined below:

CDP4.15: To ensure that green areas associated with new residential developments enrich the quality of life of local residents and provide ecologically rich areas that enhance biodiversity and contribute to the green infrastructure network in the County.

CDP14.7A: To ensure the protection and conservation of areas, sites, species and ecological networks/corridors of biodiversity value outside of designated sites throughout the County and to require an ecological assessment to accompany development proposals likely to impact on such areas or species.

CDP14.9C: To ensure full compliance with the requirements of the EU Habitats Directive, SEA Directive and associated legislation/regulations, including the associated European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), European Communities (Environmental Assessment of Certain Plans and Programmes) regulations 2004-2011, and the European Communities (Environmental Impact Assessment) Regulations 1989–2011 (or any updated/superseding legislation).

CDP14.11A: To protect and promote the sustainable management of the natural heritage, flora and fauna of the County through the promotion of biodiversity, the conservation of natural habitats and the enhancement of new and existing habitats.

CDP14.11B: To promote the conservation of biodiversity through the protection of sites of biodiversity importance and wildlife corridors, both within and between the designated sites and the wider Plan area.

CDP14.11C: To ensure that there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within 3km of known roosts.

CDP14.13: To ensure that development proposals support and enhance the connectivity and integrity of habitats in the Plan area by incorporating natural features into the design of development proposals.

CDP14.26B: To require all development proposals to address the presence or absence of invasive alien species on the proposed development site and to require the preparation of an Invasive Species Management Plan where such species are present.

CDP18.8B: To require all development proposals to address the presence or absence of invasive alien species on the proposed development site and to require the preparation of an Invasive Species Management Plan where such species are present.

CDP18.8C: To ensure the implementation of Sustainable Urban Drainage Systems (SuDS) and in particular, to ensure that all storm water generated in a new development is disposed of on-site or is attenuated and treated prior to discharge to an approved storm water system.

Methodology

Scope of Assessment

The specific objectives of the study were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site of the Proposed Development;
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the Proposed Development during its lifetime;
- Where possible, propose mitigation measures to remove or reduce those impacts at the appropriate stage of development;
- Give consideration to the observations and recommendations submitted by the Development Applications Unit to the Department of Housing, Local Government and Heritage on the 22nd of April 2022.

Zone of Influence

The 'zone of influence' (ZOI) for a project is the area over which ecological features may be affected by changes as a result of the proposed development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change. The zone of influence of the Proposed Development is considered to be the lands within the Proposed Development Site for most ecological receptors (with the exception of designated sites, e.g. European sites, Ramsar sites, Natural Heritage Areas and proposed Natural Heritage Areas – see below).

To determine the ZOI of the Proposed Development for *designated sites*, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for appropriate assessment (AA) during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of Biodiversity Chapters such as this to identify relevant designated sites potentially linked to the Proposed Development.

In addition, the guidance document published by the Department of Housing, Planning and Local Government (then DEHLG) 'Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities' (2009) was considered, which recommends an arbitrary distance of 15km as the precautionary ZOI for a plan or project being assessed for likely significant effects on European Sites, stating however that this should be evaluated on a case-by-case basis.

As such, the 15km ZOI is used in this report as an initial starting point for collating *designated sites* for this Biodiversity Chapter.

The methodology used to identify relevant designated sites comprised the following:

Use of up-to-date GIS spatial datasets for designated sites and water catchments – downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) to identify designated sites which could potentially be affected by the Proposed Development;

The catchment data were used to establish or discount potential hydrological connectivity between the project boundary and any designated sites.

All designated sites within the ZOI (within 15km of the Proposed Development site) were identified and are shown in Figure 9.2 and Figure 9.3.

The potential for connectivity with designated sites at distances greater than 15km from the Proposed Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Proposed Development Site and designated sites located at a distance greater than 15km based on the Source-Pathway-Receptor model.

Table 9-5 provides details of all relevant designated sites as identified in the preceding steps. The potential for pathways between designated sites and the Proposed Development Site was assessed on a case-by-case basis using the Source-Pathway-Receptor framework as per the OPR Practice Note PN01 (March 2021). Pathways considered included:

Direct pathways (e.g. proximity (i.e. location within the designated site), water bodies, air (for both air emissions and noise impacts)).

Indirect pathways (e.g. disruption to migratory paths, 'Sightlines' where noisy or intrusive activities may result in disturbance to shy species.

Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the Site's natural environment. The desktop study relied on the following sources:

Information on species records[1] and distributions, obtained from the National Biodiversity Data Centre (NBDC) at www.maps.biodiversityireland.ie;

Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.gis.epa.ie;

Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie ;

Information on the network of designated conservation sites, boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie;

Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;

Information on the existence of permitted developments, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Application Database available at: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team;

The current conservation status of birds in Ireland taken from Gilbert et al. (2021);

The pollinator friendly planting code provided by The All-Ireland Pollinator Plan (2015-2020, 2021-2025) available at www.pollinators.ie;

[1] The Site of the Proposed Development lies within the 2km grid square O13A. Records from the last 20 years from available datasets are given in the relevant sections of this report.

Clare Biodiversity Action Plan 2017-2023;
Clare County Council Development Plan 2017-2023;
Draft Clare County Council Development Plan 2023-2029.

Field Surveys

Habitat Surveys

Habitat surveys were carried out at the Site on the 11th of June 2021 and 19th of May 2022, and the 8th of June 2022. Habitats were categorised according to the Heritage Council's *'A Guide to Habitats in Ireland'* (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2010) published by the Heritage Council. Satellite imagery was used together with GPS to accurately enable field navigation. Habitat categories, characteristic plant species, invasive species and other ecological features were recorded.

Bat Surveys

A preliminary bat survey of the Site of the Proposed Development was undertaken by Ash Ecology & Environmental Ltd (AEE) on the 7th of September 2021 from 19.40 to 22.10 (sunset was 20.10) by walking the Site boundary and around all structures onsite. The weather was optimal for a bat survey with temperatures on the night 12-13°C with a gentle breeze. The equipment used for the bat activity surveys included a Elekon Bat Logger M detector. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight).

Dusk, dawn, and walking surveys were undertaken by Dr Tina Aughney of Bat Eco Services on the 6th and 7th of August 2022 from 10 minutes before sunset to 110 minutes post sunset and the surveyors position themselves within the Site to determine the general bat activity of the Site of the Proposed Development. The dusk survey on the 6th of August was undertaken under calm, dry, clear skies at 17°C and the dawn survey on the 7th of August was carried out under clam, dry, patchy cloud cover at 8°C.This was followed by the surveyors walking a transect of the Site and within the immediate vicinity of the Site. A Passive Static Bat Survey involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time. Static units were placed on Site from the 1st to 6th of August 2022. The Site was also assessed during daylight hours on the 1st and 6th of August 2022 to determine potential bat foraging and commuting habitat.

Full details of these bat surveys can be found in the Bat Survey Report appended to this chapter.

Bird Surveys

Breeding bird surveys were completed on the 11th of June 2021, the 19th of May 2022, and the 8th of June 2022, with further surveys by Enviroguide Ornithologist Brian McCluskey on the 1st of July 2022 and 12th of July 2022. All birds encountered on Site, through visual and/or audio means, were recorded during this survey.

Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat and bird surveys. The Site was examined for tracks and signs of mammals. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

Invasive Flora Surveys

The Site was assessed for the presence of invasive plant species during the habitat surveys undertaken.

Marsh Fritillary Butterfly Surveys

Marsh Fritillary adult surveys were carried out on the 19th of May, 8th of June, and the 22nd of July 2022. Sward height was recorded across the nine separate fields on Site during these surveys. The Site was also surveyed for the presence of Devil's-bit Scabious, the food plant associated with this species.

Assessment

This Chapter has been completed having regard to the Guidelines for Ecological Impact Assessment in the United Kingdom (UK) and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018), together with the guidance outlined in the Environmental Protection Agency documents Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015).

The value of the ecological resources, i.e. the habitats and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009b). This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. As per the NRA guidelines, impact assessment is only undertaken of key ecological receptors (KERs).

The assessment of the potential effect or impact of the Proposed Development on the identified key ecological receptors was carried out with regard to the criteria outlined in the EPA Guidelines (EPA, 2022). These guidelines set out a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts.

Value of Ecological Resources

The ecological features identified within the Site of the Proposed Development and the wider area are evaluated based on their value. These values are detailed in Table 0.1 below and are taken from the Guidelines for Assessment of Ecological Impacts of National Road Schemes published by the NRA (2009b), now Transport Infrastructure Ireland (TII).

Table 0.1: Description Of Values For Ecological Resources Based On Geographic Hierarchy Of Importance (NRA, 2009b).

Importance	Criteria
International Importance	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). Biosphere Reserve (UNESCO Man & The Biosphere Programme) Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park.

Importance	Criteria
	Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	Area of Special Amenity. Area subject to a Tree Preservation Order. Area of High Amenity, or equivalent, designated under the County Development Plan. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	0-10000000000000 Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; 0-10000000000000 Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; 0-10000000000000 Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that is of some importance in maintaining habitat links.

Impact Assessment Criteria

Once the value of the identified Key Ecological Receptors (KERs) was determined, the next step was to assess the potential effect or impact of the Proposed Development on these KERs. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009b; CIEEM, 2018) that set down a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the proposal could constitute impact or sources of impacts. Once impacts are defined, their significance was categorised using EPA Guidelines (EPA, 2022).

Identification of a risk does not constitute a prediction that it will occur, or that it will create or cause a significant impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the ecological receptor.

Criteria used to define the quality, significance and duration of effects

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the quality of effects. See Table 0.2 below.

Table 0.2: Definition Of Quality Of Effects.

Quality	Definition
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the significance of impacts. See Table 0.3 below.

Table 0.3: Definition Of Significance Of Effects.

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects. See Table 0.4 below.

Table 0.4: Definition Of Duration Of Effects.

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

Difficulties Encountered in Compiling Information

An extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

No limitations were encountered which would prevent robust conclusions being drawn as to the potential impacts of the Proposed Development.

Description of Existing Environment

The Site is comprised of 9 discrete areas of agricultural land separated by hedgerows and treelines. The Site is 11.32ha in area, and is located 1.3km southwest of Ennis, Co. Clare. The Site is bounded to the west by the N85, to the south by residential properties, with a portion of the eastern boundary also abutted by residential dwellings, and the remaining eastern and north boundaries are bordered by Ennis Golf Club. The lands to the west and south are predominantly agricultural in nature, while the lands to the north and east are urbanised.

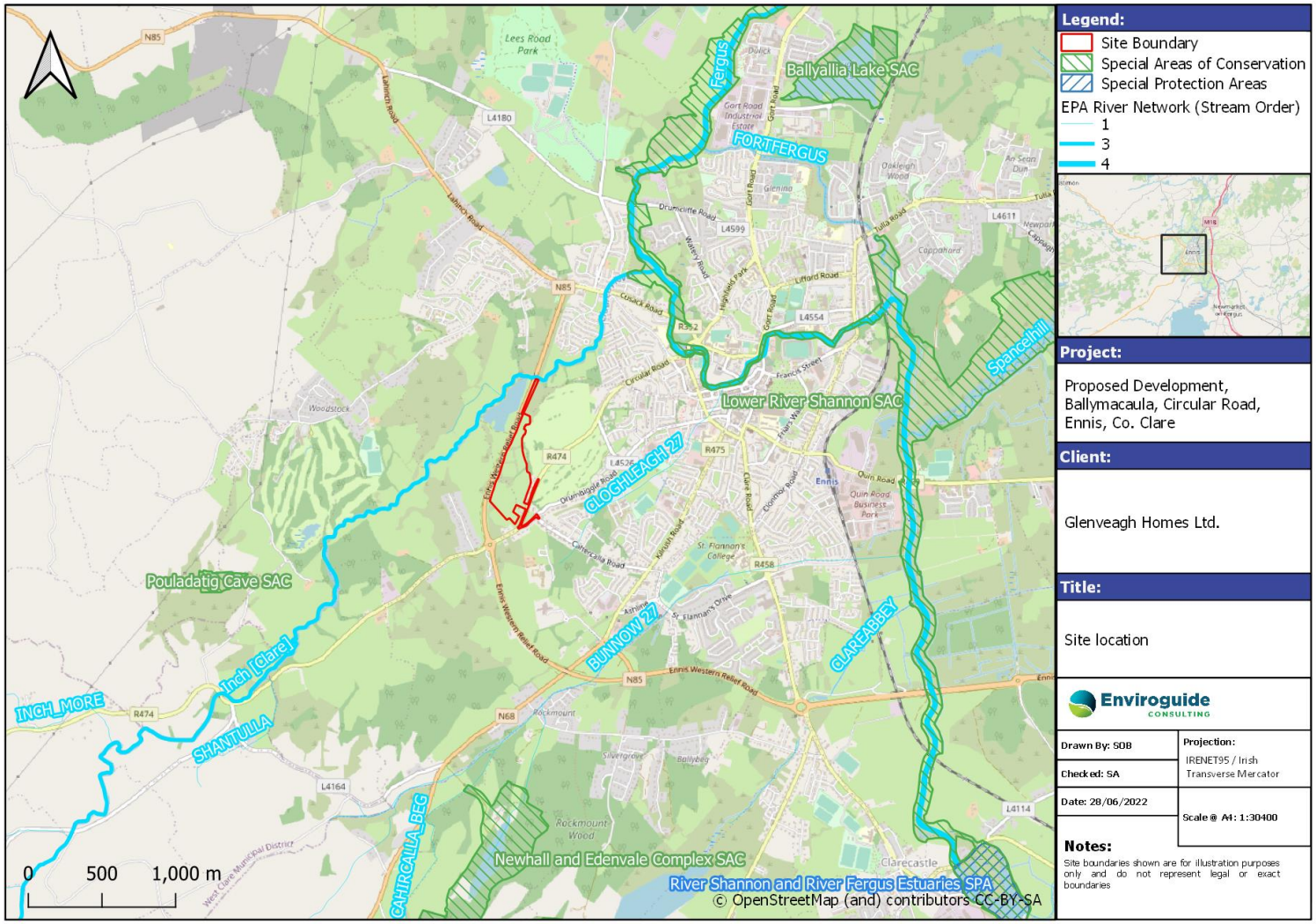

Figure 0.1: Site Location

Desk Study

Geology, Hydrology and Hydrogeology

The Site of the Proposed Development is within the Shannon Estuary North catchment and Fergus_SC_050 sub catchment. The closest watercourse to the Site is the Inch River (also referred to as Claureen River), which flows adjacent to the north boundary of the Site. The Inch River discharges into Fergus River 1.3km northeast of the Site, and ultimately enters the Shannon Estuary. The latest Q value status of the Inch River was designated as *Poor* by the EPA in 2019 (station code: RS27I010800), and, during the most recent survey period of 2013-2018, this watercourse was classified as A*t Risk* of not meeting its WFD status objectives.

The Site is situated on the Ennis groundwater body, which is *At Risk* of not meeting its WFD objectives. The aquifer type within the Site boundary is a *Regionally Important Aquifer* (Rkc) aquifer on bedrock which is *Karstified*. The groundwater rock units underlying the aquifer are classified as *Dinantian Pure Bedded Limestones* (GSI, 2022). The level of vulnerability of the Site to groundwater contamination via human activities is predominantly *Rock at or near surface*, followed by *Extreme*, with a small area of *High* along the east of the Site, and the northern area of Golf Links Road is designated as *Moderate*.

The soil in the north of the Site is classified as *Burren* (Loamy over limestone bedrock), while the south is *Kilrush* (Fine loamy drift with siliceous stones), and the Golf Links Road is designated as *Urban*. The subsoil within the southwest and north of the Site is Karstified limestone bedrock at surface (*KaRck*), while the centre and southeast of the Site is Limestone till (Carboniferous) (*TLs*), and Gold Links Road is *Made* ground (EPA, 2022).

Designated Sites

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

Natural Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

Figure 9.2 presents details of the designated sites within a 15km radius of the Proposed Development. In addition, the potential for connectivity with designated sites at distances of greater than 15km from the Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Development site and designated sites located at a distance greater than 15km from the Proposed Development.

The result of this preliminary screening concluded that there is a total of 18 SACs, 4 SPAs, 3 NHAs, and 23 pNHAs located within the Zone Of Influence of the Proposed Development Site. The distances to each site listed are taken from the nearest possible point of the Proposed Development Site boundary to nearest possible point of each European site, NHA, or pNHA.

A **Screening for Appropriate Assessment** (Enviroguide, 2022) and **Natura Impact Statement** (Enviroguide, 2022), for the Proposed Development, prepared in accordance with the requirements of Part XAB of the Planning and Development Act, 2000 (as amended) are submitted with this application under separate cover. The following conclusions are extracted from the Appropriate Assessment Screening Report and Natura Impact Statement, which concluded that the Proposed Development would not have a significant effect on any European Sites:

> *"The Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare has been assessed taking into account:*
>
> *the nature, size and location of the proposed works and possible impacts arising from the construction works.*
>
> *the qualifying interests and conservation objectives of the European sites*
>
> *the potential for in-combination effects arising from other plans and projects.*
>
> *In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that, on the basis of objective information; the possibility may be excluded that the Proposed Development will have a significant effect on any of the European sites listed below:*
>
> ***Toonagh Estate SAC (002247)***
>
> ***Knockanira House SAC (002318)***
>
> ***Old Domestic Building (Keevagh) SAC (002010)***
>
> ***Ballycullinan, Old Domestic Building SAC (002246)***
>
> ***Old Farm Buildings, Ballymacrogan SAC (002245)***
>
> ***Old Domestic Buildings, Rylane SAC (002314)***
>
> ***Newgrove House SAC (002157)***
>
> ***Slieve Aughty Mountains SPA (004168)***
>
> *However, upon examination of the relevant information including in particular the nature of the Proposed Development and the likelihood of significant effects on European Sites, the possibility may not be excluded that the Proposed Development will have a likely significant effect on any of the European Sites listed below:*
>
> ***Lower River Shannon SAC (002165)***
>
> ***Newhall and Edenvale Complex SAC (002091)***
>
> ***Pouladatig Cave SAC (000037)***
>
> ***Ballyallia Lake SAC (000014)***
>
> ***Dromore Woods And Loughs SAC (000032)***
>
> ***Ballycullinan Lake SAC (000016)***
>
> ***East Burren Complex SAC (001926)***
>
> ***Poulnagordon Cave (Quin) SAC (000064)***
>
> ***Lough Gash Turlough SAC (000051)***
>
> ***Moyree River System SAC (000057)***
>
> ***Ballyogan Lough SAC (000019)***

Ballyallia Lough SPA (004041)

River Shannon and River Fergus Estuaries SPA (004077)

Corofin Wetlands SPA (004220)

Accordingly, a Natura Impact Statement has been prepared for the Proposed Development and is included under separate cover".

"This Natura Impact Statement details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect effects of the Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare on the following European sites:

Lower River Shannon SAC (002165)

Newhall and Edenvale Complex SAC (002091)

Pouladatig Cave SAC (000037)

Ballyallia Lake SAC (000014)

Dromore Woods And Loughs SAC (000032)

Ballycullinan Lake SAC (000016)

East Burren Complex SAC (001926)

Poulnagordon Cave (Quin) SAC (000064)

Lough Gash Turlough SAC (000051)

Moyree River System SAC (000057)

Ballyogan Lough SAC (000019)

Ballyallia Lough SPA (004041)

River Shannon and River Fergus Estuaries SPA (004077)

Corofin Wetlands SPA (004220)

The above sites were identified by a screening exercise that assessed likely significant effects of a range of effects that may arise from the Proposed Development. The Appropriate Assessment investigated potential direct and indirect impacts of the Proposed Works, during both the Construction and Operational phases on the integrity and qualifying interests of the above European sites alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives.

Where the likelihood of potentially significant effects was identified, a range of mitigation and avoidance measures have been suggested to offset them. As a result of this Appropriate Assessment, it has been concluded that, ensuring the avoidance and mitigation measures are implemented in full as proposed, the Proposed Development will not have a significant adverse effect on the above European sites.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no adverse effects on the qualifying interests, special conservation interests and on the integrity and extent of Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site."

Table 0.5: Designated Sites Within 15km Of The Site Of The Proposed Development, Their Qualifying Interests, Distance To The Site Of The Proposed Development And Potential Pathways Linking The Designated Site And The Proposed Development.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Special Area of Conservation			
Lower River Shannon SAC (002165)	[1110] Sandbanks which are slightly covered by sea water all the time; [1130] Estuaries; [1140] Mudflats and sandflats not covered by seawater at low tide; [1150] Coastal lagoons; [1160] Large shallow inlets and bays; [1170] Reefs; [1220] Perennial vegetation of stony banks; [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts; [1310] Salicornia and other annuals colonising mud and sand; [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*); [1410] Mediterranean salt meadows (*Juncetalia maritimi*); [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation; [6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*); [1029] *Margaritifera margaritifera* (Freshwater Pearl Mussel); [1095] *Petromyzon marinus* (Sea Lamprey); [1096] *Lampetra planeri* (Brook Lamprey); [1099] *Lampetra fluviatilis* (River Lamprey); [1106] *Salmo salar* (Salmon); [1349] *Tursiops truncatus* (Common Bottlenose Dolphin); [1355] *Lutra lutra* (Otter)	0.9km	**Yes** – Weak hydrological pathway via surface water discharge into the Inch River during the Construction and Operational Phases and via discharges from Ennis North WwTP into River Fergus during the Operational Phase. There is also a hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.
Newhall and Edenvale Complex SAC (002091)	[8310] Caves not open to the public; [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	1.7km	**Yes** – The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with these SACs. There is potential for an indirect impact on this species during the Construction and Operational Phases of the Proposed Development via habitat loss and fragmentation, and disturbance due to human activity, including noise and lighting. There is also a hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on these SACs provided the mitigation measures within it are carried out in full.
Pouladatig Cave SAC (000037)	[8310] Caves not open to the public; [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	1.7km	

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Ballyallia Lake SAC (000014)	[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	2.5km	**Yes** – Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.
Toonagh Estate SAC (002247)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	4.8km	None – There is no hydrological connection and the Site of the Proposed Development does not fall within the 2.5km foraging range for the species associated with this SAC. In addition, the intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on the SAC arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Dromore Woods And Loughs SAC (000032)	[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation; [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels; [8240] Limestone pavements; [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat); [1355] *Lutra lutra* (Otter)	6.6km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.
Knockanira House SAC (002318)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	6.7km	None – There is no hydrological connection and the Site of the Proposed Development does not fall within the 2.5km foraging range for the species associated with these SACs. In addition, the intervening distances between the Site and the SACs are sufficient to exclude the possibility of significant effects on the SACs arising from:
Old Domestic Building (Keevagh) SAC (002010)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	7.8km	
Ballycullinan, Old Domestic	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	8.3km	

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Building SAC (002246)			emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Ballycullinan Lake SAC (000016)	[7210] Calcareous fens with Cladium mariscus and species of the Caricion davallianae	8.4km	**Yes** – Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.
Old Farm Buildings, Ballymacrogan SAC (002245)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	8.9km	None – There is no hydrological connection. In addition, the intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on the SAC arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
East Burren Complex SAC (001926)	[3140] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.; [3180] Turloughs; [3260] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; [4060] Alpine and Boreal heaths; [5130] *Juniperus communis* formations on heaths or calcareous grasslands; [6130] Calaminarian grasslands of the *Violetalia calaminariae*; [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites); [6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*); [7210] Calcareous fens with Cladium mariscus and species of the *Caricion davallianae*; [7220] Petrifying springs with tufa formation	9.5km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	(Cratoneurion); [7230] Alkaline fens; [8240] Limestone pavements; [8310] Caves not open to the public; [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*); [1065] *Euphydryas aurinia* (Marsh Fritillary); [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat); [1355] *Lutra lutra* (Otter)		
Poulnagordon Cave (Quin) SAC (000064)	[8310] Caves not open to the public; [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	10.2km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on these SACs provided the mitigation measures within it are carried out in full.
Lough Gash Turlough SAC (000051)	[3180] Turloughs; [3270] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	10.7km	
Moyree River System SAC (000057)	[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation; [7230] Alkaline fens; [8240] Limestone pavements; [8310] Caves not open to the public; [1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat); [1355] *Lutra lutra* (Otter)	11.2km	
Old Domestic Buildings, Rylane SAC (002314)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	12.0km	None – There is no hydrological connection. In addition, the intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on the SAC arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Newgrove House SAC (002157)	[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	12.2km	None – There is no hydrological connection. In addition, the intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on the SAC arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
			Site during Construction and Operational Phase.
Ballyogan Lough SAC (000019)	[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	12.6km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SAC provided the mitigation measures within it are carried out in full.
Special Protection Area			
Ballyallia Lough SPA (004041)	[A050] Wigeon *Anas penelope*; [A051] Gadwall *Anas strepera*; [A052] Teal *Anas crecca*; [A053] Mallard *Anas platyrhynchos*; [A056] Shoveler *Anas clypeata*; [A125] Coot *Fulica atra*; [A156] Black-tailed Godwit *Limosa limosa*; [A999] Wetland and Waterbirds	2.9km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SPA provided the mitigation measures within it are carried out in full. The Site does not provide significant *ex-situ* habitat for QI/SCI species within the Site of the Proposed Development.
River Shannon and River Fergus Estuaries SPA (004077)	[A017] Cormorant *Phalacrocorax carbo*; [A038] Whooper Swan *Cygnus cygnus*; [A046] Light-bellied Brent Goose *Branta bernicla hrota*; [A048] Shelduck *Tadorna tadorna*; [A050] Wigeon *Anas penelope*; [A052] Teal *Anas crecca*; [A054] Pintail *Anas acuta*; [A056] Shoveler *Anas clypeata*; [A062] Scaup *Aythya marila*; [A137] Ringed Plover *Charadrius hiaticula*; [A140] Golden Plover *Pluvialis apricaria*; [A141] Grey Plover *Pluvialis squatarola*; [A142] Lapwing *Vanellus vanellus*; [A143] Knot *Calidris canutus*; [A149] Dunlin *Calidris alpina*; [A156] Black-tailed Godwit *Limosa limosa*; [A157] Bar-tailed Godwit *Limosa lapponica*; [A160] Curlew *Numenius arquata*; [A162] Redshank *Tringa totanus*; [A164] Greenshank *Tringa nebularia*; [A179] Black-headed Gull *Chroicocephalus ridibundus*; [A999] Wetland and Waterbirds	3.8km	Yes – Weak hydrological pathway via surface water discharge into the Inch River during the Construction and Operational Phases and via discharges from Ennis North WwTP into River Fergus during the Operational Phase. There is also a hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SPA provided the mitigation measures within it are carried out in full. The Site does not provide significant *ex-situ* habitat for QI/SCI

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
			species within the Site of the Proposed Development.
Slieve Aughty Mountains SPA (004168)	[A082] Hen Harrier *Circus cyaneus*; [A098] Merlin *Falco columbarius*	10.3km	None – There is no hydrological connection. In addition, the intervening distance between the Site and the SPA is sufficient to exclude the possibility of significant effects on the SPA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase. The Site does not provide significant *ex-situ* habitat for QI/SCI species within the Site of the Proposed Development.
Corofin Wetlands SPA (004220)	[A004] Little Grebe *Tachybaptus ruficollis*; [A038] Whooper Swan *Cygnus cygnus*; [A050] Wigeon *Anas penelope*; [A052] Teal *Anas crecca*; [A156] Black-tailed Godwit *Limosa limosa*; [A999] Wetland and Waterbirds	10.8km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, the NIS concluded that there is no likelihood of significant effects on this SPA provided the mitigation measures within it are carried out in full. The Site does not provide significant *ex-situ* habitat for QI/SCI species within the Site of the Proposed Development.
Natural Heritage Area			
Oysterman's Marsh NHA (002439)	[4] Peatlands	10.7km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the NHA is sufficient to exclude the possibility of significant effects on the NHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
			from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Lough Acrow Bogs NHA (002421)	[4] Peatlands	11.6km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the NHA is sufficient to exclude the possibility of significant effects on the NHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Lough Naminna Bog NHA (002367)	[4] Peatlands	14.3km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the NHA is sufficient to exclude the possibility of significant effects on the NHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Proposed Natural Heritage Area			
Cahircalla Wood (001001)	This wood is situated about 2km south-west of Ennis and is a fine example of woodland over limestone. Habitat diversity is increased by a small area of wet woodland dominated by willow (*Salix spp.*). Further diversity is created by the presence of shattered limestone pavement in the northern sector, with species such as Blue Moor-grass (*Sesleria albicans*), Devil's-bit Scabious (*Succisia pratensis*) and Rue-leaved Saxifrage (*Saxifraga tridactylites*). A good range of woodland bird species occurs, including Sparrowhawk, Treecreeper, tits and finches. Grey heron, Snipe and Stonechat were also observed. Fox and Badger are present.	0.7km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to these pNHAs.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	The main interest of this site is that it is a fine example of relatively intact mostly native woodland. Habitat diversity is provided by the presence of scrub, wet woodland and limestone pavement.		
Newhall And Edenvale Complex (002091)	Refer to Qualifying Interests for Newhall And Edenvale Complex SAC.	1.7km	**Yes** – The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with these pNHAs. There is potential for an indirect impact on this species during the Construction and Operational Phases of the Proposed Development via habitat loss and fragmentation, and disturbance due to human activity, including noise and lighting. There is also a hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to these pNHAs.
Pouladatig Cave (000037)	Refer to Qualifying Interests for Pouladatig Cave SAC.	1.7km	
Ballyallia Lake (000014)	Refer to Qualifying Interests for Ballyallia Lake SAC.	2.5km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to these pNHAs.
Lough Cleggan (001331)	Lough Cleggan is a small freshwater lake situated east of the larger Ballyallia Lake, approximately 4km north-west of Ennis, Co. Clare. The lake is of local importance for wintering wildfowl, although recent counts are not available. Breeding bird species include Tufted Duck and Coot. The main interest of this site is that it has a good diversity of habitats and plant species. It is also of at least local importance for wintering wildfowl and probably should be considered as part of the Ballyallia complex. The site provides habitat for some breeding species. Further monitoring of bird populations is required.	2.8km	
Newpark House (Ennis) (000061)	This pNHA is a guesthouse which has outbuildings which support a roost for Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The site is considered an internationally important nursery site.	3.3km	**None** – There is no hydrological connection and the Site is located outside the 2.5km foraging range of the species associated with this pNHA. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
			vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Fergus Estuary And Inner Shannon, North Shore (002048)	Refer to qualifying interests for Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.	3.7km	Yes – Weak hydrological pathway via surface water discharge into the Inch River during the Construction and Operational Phases and via discharges from Ennis North WwTP into River Fergus during the Operational Phase. There is also a potential hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to this pNHA.
Dromore Woods And Loughs (000032)	Refer to qualifying interests of Dromore Woods And Loughs SAC.	6.6km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to this pNHA.
Old Domestic Building (Keevagh) (002010)	Refer to qualifying interests of Old Domestic Building (Keevagh) SAC.	7.8km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
Dromoland Lough (001008)	Dromoland Lough lies about 3km north-west of Newmarket on Fergus. This contains many marsh species, with sedges (*Carex spp.*) being particularly well represented including Bottle Sedge (*Carex rostrata*), Slender Sedge (*C. lasiocarpa*), Tufted-sedge (*C. elata*), Lesser Tussock-sedge (*C. diandra*), Greater Pond-sedge (*C. riparia*), Fibrous Tussock-sedge (*C. appropinquata*) and Long-stalked Yellow-sedge (*C. lepidocarpa*). Reed Canary-grass (*Phalaris arundinacea*) is dominant in some areas. Other species include Grass-of-parnassus (*Parnassia palustris*), Marsh Lousewort (*Pedicularis palustris*) and Eyebright (*Euphrasia scottica*). Other species which have been recorded at this site are Creeping-Jenny (*Lysimachia nummularia*), Marsh Fern (*Thelypteris palustris*), Yellow Water-lily (*Nuphar lutea*) and pondweeds (*Potamogeton spp.*). Dark-red Helleborine (*Epipactis atrorubens*), a species typical of Burren areas, has been recorded from the site. This site is of interest as it contains a diverse flora, particularly of marsh species.	8.3km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to these pNHAs.
Ballycullinan Lake (000016)	Refer to qualifying interests for Ballycullinan Lake SAC	8.4km	
Inchicronan Lough (000038)	Inchicronan Lough is a medium sized lake situated approximately 2km south of Crusheen, Co. Clare. A variety of habitats are found around the lake including an area of cut-over bog to the north, Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*) woodland along the eastern shore and a complex mosaic of wet grassland, dense scrub and marsh at the southern end. Inchicronan Lough has interesting aquatic and terrestrial land communities. The lake is of local ornithological interest with the presence of a flock of 30 wild swans, some duck and Cormorants.	9.1km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Durra Castle (000033)	Durra Castle is an old tower castle near O'Brien's Big Lake, east of Barefield, Co. Clare. Although the castle is in a poor state of repairs and is used as a cattle shelter, one darkened passage on the second floor is used during the summer months by a small colony of female and juvenile Lesser Horseshoe Bats (*Rhinolophus hipposideros*). This is a site of national importance. The highest number of bats recorded at this site was 75 in August l983 – 50 were counted there in August l987 while only 36 were recorded in l993. Although less than l00 bats have been recorded at this site, it is one of the few nursery sites at the	9.3km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	eastern edge of the distribution of the Lesser Horseshoe Bat in Ireland. It is possible that, if the site was protected with a grille, numbers could exceed l00 bats and the site would become one of international importance. It is also important because of the close proximity of suitable foraging habitat.		from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
East Burren Complex (001926)	Refer to qualifying interests of East Burren Complex SAC.	9.5km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to these pNHAs.
Poulnagordon Cave (Quin) (000064)	Refer to qualifying interests of Poulnagordon Cave (Quin) SAC.	10.2km	
Lough Gash Turlough (000051)	Refer to qualifying interests for Lough Gash Turlough SAC.	10.7km	
Ballycar Lough (000015)	Ballycar Lough is a small calcareous late situated approx. 1.5km north of Newmarketon-Fergus in Co. Clare. The sheltered location of the lake makes it ideal habitat for a large number of waterfowl populations. The main interest of this site is its ecological value which stems from the transitory state of the fen vegetation on the northern limb. Here incipient bog vegetation (e.g. Bog-myrtle (*Myrica gale*) and Purple Moor-grass (*Molinia caerulea*) has invaded a fen community so that conditions are finely balanced between the two.	11.1km	
Moyree River System (000057)	Refer to qualifying interests for Moyree River System SAC.	11.2km	
Fort Fergus (Ballynacally) (000035)	This Lesser Horseshoe Bat (*Rhinolophus hipposideros*) roost is located in four small lofts in a block of farm buildings attached to Fort Fergus House, Ballynacally, Co. Clare. Small numbers of bats (<50) use the lofts during the summer but it is not known if the site is a nursery site or a roost of male and non-breeding females. This site has not been visited since the late eighties so the numbers using the lofts may have increased. It is a site of national importance and one of the few known in this area of Munster.	12.1km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Fin Lough (Clare) (001010)	Fin Lough is a small to medium sized calcareous lake situated approx. 2km north-east of Newmarket on Fergus, Co. Clare. The fringing vegetation is diverse with good examples of fen, raised bog, heath and scrub habitats. A beetle, *Panagaeus cruxmajor*, has been recorded twice at	12.2km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from:

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	Fin Lough. This represents one of a small number of Irish stations for this insect. The lake is a popular waterfowl site. The main interest of this site is as a zoological site. However, there is a good range of semi-natural habitats, many of which are relatively undisturbed which contribute to the ecological interest of this lake.		emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Ballyogan Lough (000019)	Refer to qualifying interests for Ballyogan Lough SAC	12.5km	**Yes** – Hydrogeological pathway via groundwater with potential for contamination during the Construction and Operational Phases of the Proposed Development. However, due to mitigation measures outlined in the NIS, there will be no potential for significant impacts to this pNHA.
Rosroe Lough (002054)	Rosroe Lough is a small lake (a little over 3km long) in Co. Clare, in a shallow basin bounded by Finn Lough to the west and a complex of limestone outcrops, scrub and cultivated fields to the east. Several small lakes are associated with Rosroe. There is a healthy bird presence in Knocknalappa Lough including Coot, Dabchicks and a pair of Great Crested Grebe. While Rosroe Lough is a refuge in an area of relatively high agricultural inputs, its outstanding value as an NHA refers to the south-east corner from Knocknalappa Lough to Rathlaheen North. The most valuable area is the Holly-dominated scrub and associated grassland. Here there is a finely struck balance between the requirements of moisture and acid-loving species and those requiring a more demanding dry, alkaline regime. This theme is echoed throughout the site but nowhere is such a fragile balance struck than at this location. As this area is both undulating and contains many rock outcrops it has remained undisturbed. However, any interference here is likely to have serious negative consequences for this balance.	13.5km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Paradise House (Ballynacally) (000062)	This Lesser Horseshoe Bat (*Rhinolophus hipposideros*) roost is located in the outbuildings associated with the ruins of Paradise House, outside Ballynacally, Co. Clare. Small numbers of bats (<50) use the outbuildings during the summer but it is not known if the site is a nursery site or a roost of male and non-breeding females. This site has not been visited since the late eighties but should still be considered a site of	14.7km	**None** – There is no hydrological connection. In addition, the intervening distance between the Site and the pNHA is sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase;

Site Name & Code (Receptor)	Qualifying Interests (*= priority habitats)	Distance to Site	Potential Pathway to receptor
	national importance as it is one of the few Lesser Horseshoe Bat roosts known in this area of Munster. Paradise House and its outbuildings are surrounded by mature woodland and overlook the Shannon Estuary, both ideal foraging habitats for Lesser Horseshoe Bats.		increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.

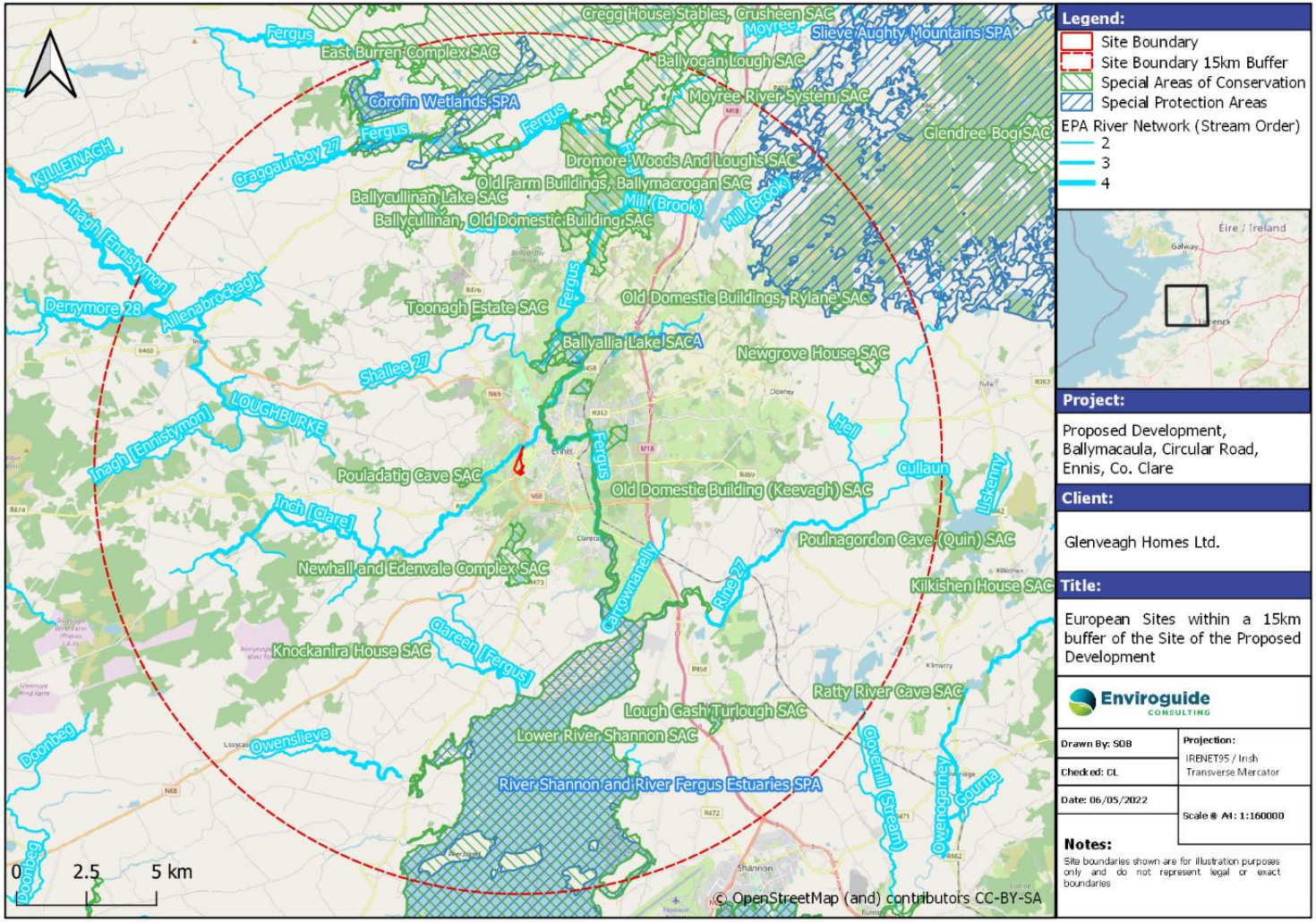

Figure 0.2: European Sites Within 15km Of the Proposed Development Site.

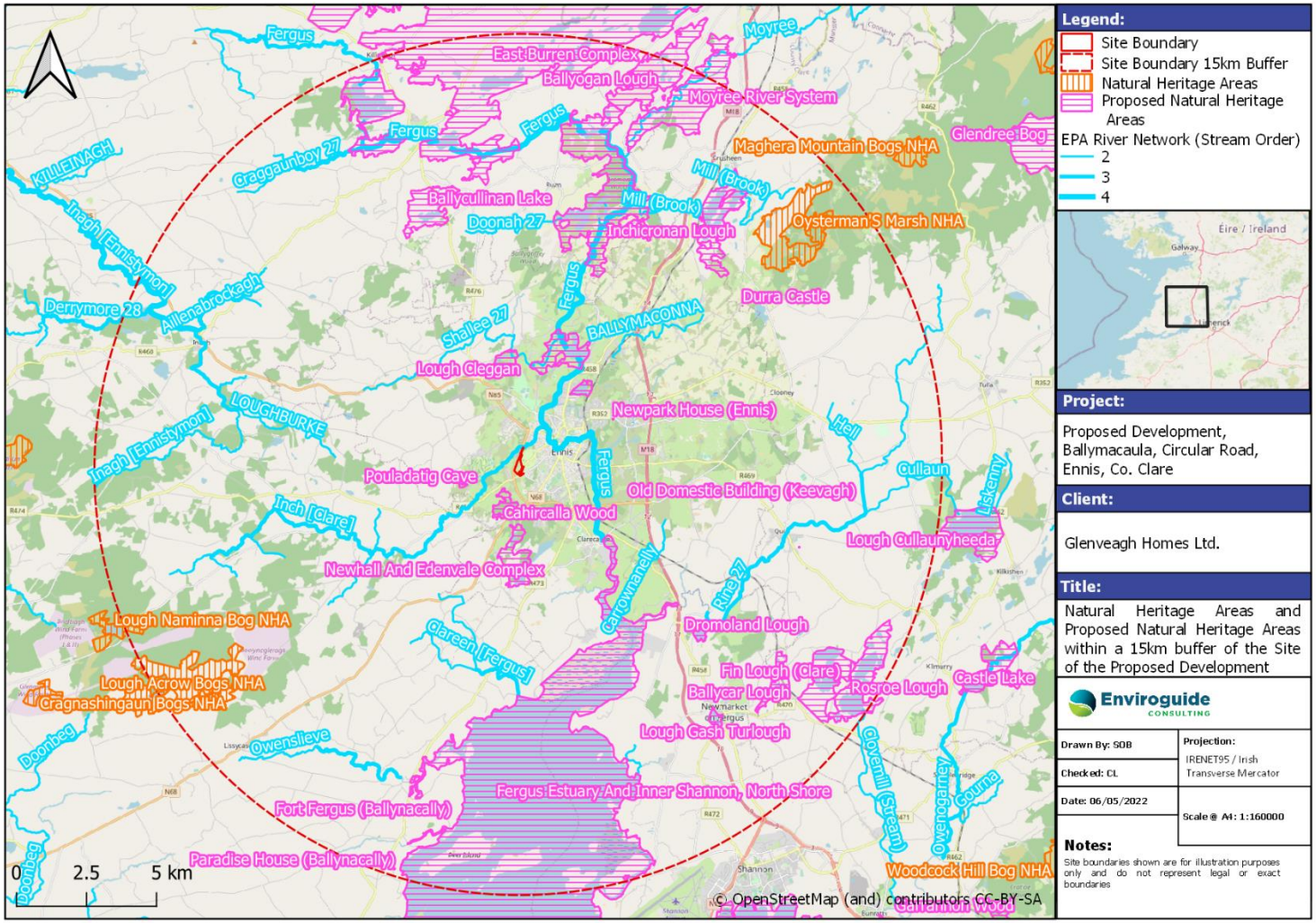

Figure 0.3: Natural Heritage Areas and Proposed Natural Heritage Areas Within 15km Of the Proposed Development Site.

Species and Species Groups

The Site of the Proposed Development is located within the R37I Ordnance Survey tetrad. Species records from the National Biodiversity Data Centre (NBDC) online database for this grid square was studied for the presence of rare or protected flora and fauna. The following records were excluded:

Records greater than 20 years old;

Species records with no designation or conservation status (excluding mammals and birds).

In addition, data from various sources (e.g. Inland Fisheries Ireland) were used to determine the presence of species in the vicinity of the Proposed Development. The following sections outline the results of this assessment.

Flora

Rare and Protected Flora

Species records from the NBDC online database were studied for the presence of rare of protected flora and no records were found. There are no records for protected bryophytes within the area[2].

Invasive Plant Species

The NBDC have records (dated within the last 20 years) of one *High Impact* and two *Medium Impact* invasive plant species within the 2km (R37I) grid square Table 0.6.

Table 0.6: Invasive Plant Species Within The 2km (R37I) Tetrad. The Records Are Dated Within The Last 20 Years And Are Provided By The NBDC.

Name	Date of last record	Database	Legal status / Designation
Japanese Knotweed *Fallopia japonica*	06/10/2017	National Invasive Species Database	High Impact Invasive Regulation S.I. 477 (Ireland)
Japanese Rose *Rosa rugosa*	26/05/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive
Sycamore *Acer pseudoplatanus*	27/10/2006	Clare Biological Records Centre Dataset 2004-2007	Medium Impact Invasive

Non-volant Mammals

Records for terrestrial mammals were retrieved from the NBDC online database. Table 0.7 lists these species, their last record date and summarises their legal status/designation. Four native terrestrial mammals were recorded within the 2km grid square (R37I), three of which, the Red Squirrel, Otter, and Hedgehog, are afforded protection under the Wildlife (Amendment) Act, 2000.

Red Squirrel was recorded as roadkill along the Bank Place road, 1.5km northeast of the Site, in 2017. The Otter records were recorded as a roadkill sighting along Shanaway Road, 750m northwest of the Site, and live animal sightings within and along the River Fergus. There is a number of Hedgehog records throughout the landscape surrounding the Site of the Proposed Development.

[2] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e

Table 0.7: Non-Volant Mammal Species Within The R37I Tetrad. The Records Are Dated Within The Last 20 Years And Are Provided By The NBDC.

Name	Date of last record	Database	Legal Status / Designation
Eurasian Red Squirrel *Sciurus vulgaris*	24/10/2017	Mammals of Ireland 2016-2025	Wildlife (Amendment) Act, 2000
European Otter *Lutra lutra*	15/09/2018	Mammals of Ireland 2016-2025	EU Habitats Directive Annex II & IV Wildlife (Amendment) Act, 2000
Red Fox *Vulpes vulpes*	18/06/2018	Mammals of Ireland 2016-2025	n/a
West European Hedgehog *Erinaceus europaeus*	15/10/2020	Hedgehogs of Ireland	Wildlife (Amendment) Act, 2000

Bats

There are records of 6 bat species within the tetrad associated with the Site (R37I) (Table 0.8). The NBDC maps landscape suitability for bats based on Lundy et al. (2011). The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The overall habitat suitability index for bats in the area is 56.44. The species with the highest individual suitability scores for the area encompassing the Site are Brown Long-eared Bat *Plecotus auritus* and Lesser Noctule *Nyctalus leisleri* with 79 and 68, respectively.

Table 0.8: Bat Species Within The R37I Tetrad. The Records Are Dated Within The Last 20 Years And Are Provided By The NBDC.

Name	Date of last record	Database	Legal Status / Designation
Brown Long-eared Bat *Plecotus auritus*	21/09/2010	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000
Daubenton's Bat *Myotis daubentonii*	29/08/2013	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000
Lesser Horseshoe Bat *Rhinolophus hipposideros*	21/09/2010	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000
Lesser Noctule *Nyctalus leisleri*	09/08/2013	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000
Pipistrelle *Pipistrellus pipistrellus sensu lato*	09/08/2013	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000
Soprano Pipistrelle *Pipistrellus pygmaeus*	21/09/2010	National Bat Database of Ireland	EU Habitats Directive Annex IV Wildlife (Amendment) Act, 2000

Birds

A total of 59 bird species have been recorded within the 2km grid square by the NBDC. Of these, 6 are listed as *Red*, and 16 are listed as *Amber* in *Birds of Conservation Concern in Ireland 2020-2026* (Gilbert et al., 2021).

Red listed species include:

Snipe *Gallinago gallinago*
Swift *Apus apus*
Grey Wagtail *Motacilla cinerea*
Meadow Pipit *Anthus pratensis*
Lapwing *Vanellus vanellus*
Redwing *Turdus iliacus*

Amber listed species include:

Swallow *Hirundo rustica*
Black-headed Gull *Larus ridibundus*
Brambling *Fringilla montifringilla*
Kingfisher *Alcedo atthis*
Linnet *Carduelis cannabina*
Starling *Sturnus vulgaris*
Tree Sparrow *Passer montanus*
Greenfinch *Carduelis chloris*
Goldcrest *Regulus regulus*
Cormorant *Phalacrocorax carbo*
House Sparrow *Passer domesticus*
Mallard *Anas platyrhynchos*
Mew Gull *Larus canus*
Mute Swan *Cygnus olor*
Sand Martin *Riparia riparia*
Willow Warbler *Phylloscopus trochilus*

Fish

There were no fish species recorded within the 2km grid square by the NBDC.

There are three species of salmonid associated with freshwater habitats in Ireland, namely Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*) and Arctic Char (*Salvelinus alpinus*), the latter of which is only associated with lake waterbodies in Ireland. The Atlantic salmon is listed as an Annex II species under the Habitat Directive. A fish survey of the Inch River was carried out by Inland Fisheries Ireland (IFI) in 2017. Two age classes of Brown Trout, 0+, 1+ & older, and one age class of Salmon, 1+ & older, were recorded at Inch Bridge, 2.2km southwest of the Site of the Proposed Development (Matson et al., 2018). Salmon and Brown Trout have also been recorded with the River Fergus (IFI, 2020).

There are three lamprey species native to Ireland including Sea Lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*) and Brook Lamprey (*Lampetra planeri*). All three species are listed under Annex II of the Habitats Directive and are protected by the Fisheries Acts 1959 to 2006. Lamprey are also listed as Qualifying Interests for the Lower River Shannon SAC.

The European Eel *Anguilla anguilla* is a red listed, native Irish species and is considered one of the most threatened fish species in Ireland (King et al., 2011). Eels were captured during IFI fish surveys of the Inch River in 2017 (Matson et al., 2018) and in the River Fergus (IFI, 2020).

Amphibians

The Common Frog *Rana temporaria* was recorded within the relevant tetrad in 2003, and there are no records of Smooth Newt *Lissotriton vulgaris* (*NBDC: Amphibians and reptiles of Ireland*).

Invertebrates

There are no records of protected invertebrates within the 2km (R37I) grid square.

Reptiles

There are no records of common lizard *Zootoca vivipara* within the tetrad associated with the Site (R37I). This species is associated with coastal and heathland habitats, but also locally in rural gardens, stone walls and roadside verges (King et al., 2011).

Field Surveys

Habitats and Flora

The habitats encountered and identified at the Site of the Proposed Development on the 11th of June 2021 and 19th of May 2022 have been classified and coded as per Fossitt (2000). The habitats and the flora contained within them did not significantly change in nature between these survey periods. The habitats recorded at the Site are listed and described below.

Improved Agricultural Grassland (GA1)
Wet Grassland (GS4)
Treeline (WL2)
Hedgerow (WL1)
Stone Walls and Other Stonework (BL1)
Buildings and Artificial Surfaces (BL3)
Scrub (WS1)

Habitats at the Site are primarily semi-natural in nature, with the fields that comprise the majority of the Site classified as *Improved Agricultural Grassland (GA1)* habitat due to the species present. Floral species found within this habitat on the Site include Buttercup (*Ranunculus sp*.), White Clover (*Trifolium repens*), Red Clover (*Trifolium pratense*), Selfheal (*Prunella vulgaris*), Ribwort Plantain (*Plantago lanceolata*), Bird's-foot Trefoil (*Lotus corniculatus*), Daisy (*Bellis perennis*), Oxeye Daisy (*Leucanthemum vulgare*), and Ragwort (*Senecio jacobaea*), with Nettle (*Urtica dioica*) present closer to the field margins. Heath Spotted-Orchid (*Dactylorhiza maculata*) and Common Spotted-Orchid (*Dactylorhiza fuchsia*) were observed within the north-most *Wet Grassland (GS4)* on Site. Areas of *Wet Grassland (GS4)* habitat were also recorded within the fields on Site, with rushes (*Juncus sp*.), Marsh Thistle (*Cirsium palustre*), and Silverweed (*Potentilla anserina*) present.

This habitat is both bounded and separated by *Hedgerow (WL1)* and *Treeline (WL2)* habitat, with some areas of this linear vegetation transitioning into *Scrub (WS1)*. Species found within the hedgerow habitat include Bramble (*Rubus fruticosus agg*.), Blackthorn (*Prunus spinosa*), Hazel (*Corylus avellana*), young Oak (*Quercus robur*), and Ivy (*Hedera helix*), while the treelines were comprised of older Oak, Hazel, Ivy and Beech (*Fagus sylvatica*).

Older stone walls (*Stone Walls and Other Stoneworks (BL1)*) are present within lengths of the hedgerows and treelines, although due to the dense nature of this vegetation, the presence of the stonewalls could not be confirmed throughout. A more modern stone wall exists along the east boundary, separating the residential dwellings that abut the Site. Large stands of *Scrub (WS1)*, consisting primarily of Bramble, are found within the central area and northern area of the Site, with the remaining Scrub habitat found within the centre of the Site as hedgerows and treelines merge and have become overgrown. *Buildings and Artificial Surfaces (BL3)* habitat is created by Golf Links Road along the east of the Site.

Figure 0.4: Improved Agricultural Grassland (GA1) With Hedgerow (WL1) Habitat In The Background. Image Taken On June 8th 2022.

Figure 0.5: An Example Of Stone Walls And Other Stoneworks (BL1) Within The Treeline (WL2) Habitat On Site. Image Taken On June 11th 2021.

Figure 0.6: Scrub (WS1) Habitat Present Within The North Of The Site. Image Taken June 11th 2021.

Figure 0.7: An Example Of Wet Grassland (GS4) Habitat Observed On Site. Image Taken June 8th 2022.

Invasive Species

Non-native species in Ireland have been assessed and assigned an impact rating of either 'High', 'Medium' or 'Low' impact based on a number of factors that determine a species' potential to become established in this country and have significant impacts (Kelly et al., 2013). Invasive species can also be rated as an 'Amber-list species', which signifies a 'Medium' impact potential or established invasive species that may pose a threat to conservation goals (Invasive Species Ireland).

No species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011) including Japanese Knotweed (Reynoutria japonica) were recorded at the Site.

One 'Medium Impact' invasive species was recorded on Site, namely Sycamore (*Acer pseudoplatanus)*, which was recorded within the treeline which bounds the south of the north-most Site.

Figure 0.8: Sycamore recorded on the Site of the Proposed Development

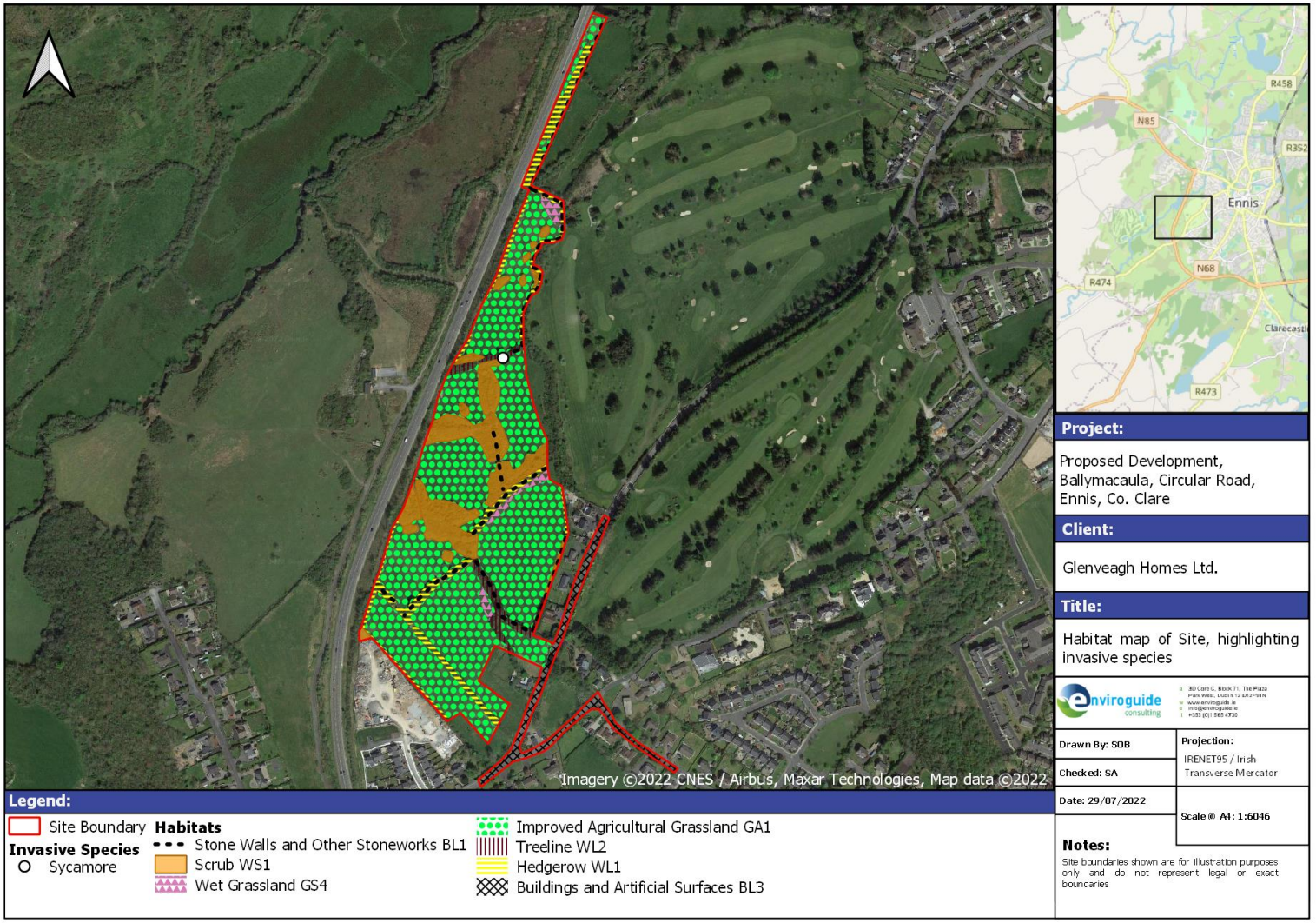

Figure 0.9: Habitats At The Site Of The Proposed Development.

Non-Volant Mammals

Several mammal tracks were visible throughout the Site, particularly along the field boundaries and extending into the dense area of Scrub, with areas of flattened grassland adjacent to the hedgerows on Site, suggesting rest areas for Fox *Vulpes vulpes* on Site. There were several instances of Fox scat and Rabbit *Oryctolagus cuniculus* droppings observed throughout the Site. It is considered likely these species inhabit the Site. An adult Fox was also observed on Site on the 11th of June 2021, which travelled through the grassland into an area of overgrown hedgerow where it could no longer be observed. Although protected from direct harm and certain forms of hunting/trapping, Fox is not considered to be of conservation concern in Ireland.

The large mammal trails observed on Site also suggest that Badger *Meles meles* may utilise this Site, particularly within the areas of scrub habitat, although no other signs, including dens, latrines, or prints, were found.

A dead Stoat *Mustela erminea subsp. hibernica* was located on Site during the breeding bird surveys in July 2022, indicating smaller hedgerow mammals utilise this Site.

Figure 0.10: Fox Scat (Left) And Rabbit Droppings (Right) Observed On Site. Images Taken On June 11th 2021.

Breeding Birds

Breeding bird surveys were carried out on Site on the 1st of July 2022 and 12th of July 2022. Five transects were done through the site to record all the species that were present. A final zig-zag walk through the site was done at the end of each survey to ensure no additional species were missed. **26** species were recorded on the Breeding Bird Survey on the 1st of July 2022 and **28** species were recorded on the Breeding Bird Survey on the 12th July 2022. These species are listed in the table below.

Methodology: Each transect was divided up into four parts (all a similar distance) and the transect was walked with all species noted at each side of the ecologist. Distance brackets were also used, however, due to the lack of suitable habitat outside of the site, the majority of species were recorded inside the site boundary and within 50 meters each side of the surveyor on each transect.

Meadow Pipit was the only red listed species recorded.

Table 0.9: Birds recorded during the breeding bird surveys on the 1st of July and 12th of July 2022

Species	BoCCI Status	BBS Survey 1 & 2 or 1/2	Breeding Activity
Blackbird *Turdus merula*	Green	1 & 2	Confirmed. Recently fledged young.
Blackcap *Sylvia atricapilla*	Green	1 & 2	
Bullfinch *Pyrrhula pyrrhula*	Green	1 & 2	
Blue Tit *Cyanistes caeruleus*	Green	1 & 2	Confirmed. Recently fledged young
Chaffinch *Fringilla coelebs*	Green	1 & 2	
Chiffchaff *Phylloscopus collybita*	Green	1 only	
Collared Dove *Streptopelia decaocto*	Green	2 only	
Dunnock *Prunella modularis*	Green	1 & 2	Confirmed. Recently fledged young
Goldcrest *Regulus regulus*	Amber	1 & 2	Confirmed. Recently fledged young
Goldfinch *Carduelis carduelis*	Green	1 & 2	Confirmed. Recently fledged young
Great Tit *Parus major*	Green	2 only	
Hooded Crow *Corvus cornix*	Green	1 & 2	
House Martin *Delichon urbicum*	Amber	1 & 2	
House Sparrow *Passer domesticus*	Amber	1 & 2	Confirmed. Recently fledged young.
Lesser Redpoll *Acanthis flammea*	Green	1 & 2	
Linnet *Linaria cannabina*	Amber	1 & 2	
Meadow Pipit *Anthus pratensis*	Red	1 & 2	Confirmed. Carrying food + recently fledged young present
Pied Wagtail *Motacilla alba yarrelli*	Green	1 & 2	
Reed Bunting *Emberiza schoeniclus*	Green	1 & 2	Confirmed. Recently fledged young
Robin *Erithacus rubecula*	Green	1 & 2	Confirmed. Recently fledged young.
Rook *Corvus frugilegus*	Green	1 & 2	
Siskin *Spinus spinus*	Green	2 only	
Stonechat *Sturnus vulgaris*	Amber	1 & 2	Confirmed. Recently fledged young
Swallow *Hirundo rustica*	Amber	1 & 2	
Song Thrush *Turdus philomelos*	Green	1 & 2	Confirmed. Recently fledged young
Whitethroat *Sylvia communis*	Green	1 & 2	Confirmed. Recently fledged young
Woodpigeon *Columba palumbus*	Green	1 & 2	
Wren *Troglodytes troglodytes*	Green	1 & 2	Confirmed. Recently fledged young
Willow Warbler *Phylloscopus trochilus*	Amber	1 & 2	Confirmed. Recently fledged young

The majority of bird species were associated with the hedgerows and treelines that run along the field margins of the Site lands, with birdsong heard throughout the Site, and particularly within the dense areas of Scrub within the central area of the Site.

The bird species recorded during the site visit on 11th of June 2021 are outlined in Table 0.10.

Table 0.10: Birds Recorded On The Site – 11th Of June 2021.

Species	BoCCI[3]	Observations/Notes
Wren *Troglodytes troglodytes*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Blue Tit *Cyanistes caeruleus*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Hooded Crow *Corvus cornix*	Green	Observed foraging within the grassland on Site
Wood Pigeon *Columba palumbus*	Green	Several individuals observed within the treeline habitat on Site
Starling *Sturnus vulgaris*	Amber	Several individuals observed within the scrub habitat within the north of the Site
Herring Gull *Larus argentatus*	Amber	Observed flying over the Site
House Martin *Delichon urbicum*	Amber	Observed flying over the Site
Swallow *Hirundo rustica*	Amber	Observed flying over the Site
Bullfinch *Pyrrhula pyrrhula*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Feral Pigeon *Columba livia*	Green	Several individuals observed within the treeline habitat on Site
Magpie *Pica pica*	Green	Several individuals observed within the treeline habitat on Site
Blackcap *Sylvia atricapilla*	Green	One individual observed sitting on the overhead wires on Site

The species recorded on Site on the 19th of May 2022 are outlined in Table 0.11. It is highly likely these birds were breeding on Site.

Table 0.11: Birds Recorded On Site – 19th Of May 2022

Species	BoCCI	Observations/Notes
Goldfinch *Carduelis carduelis*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Chiffchaff *Phylloscopus collybita*	Green	Several individuals heard singing throughout the Site
Starling *Sturnus vulgaris*	Amber	Several individuals observed throughout the hedgerow and treeline habitat on Site
Wood Pigeon *Columba palumbus*	Green	Several individuals observed within the treeline habitat on Site
Great tit *Parus major*	Green	Several individuals observed within the scrub habitat within the north of the Site
Herring Gull *Larus argentatus*	Amber	Observed flying over the Site
Swallow *Hirundo rustica*	Amber	Observed flying over and throughout the Site
Wren *Troglodytes troglodytes*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Robin *Erithacus rubecula*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Blue Tit *Cyanistes caeruleus*	Green	Several individuals observed throughout the hedgerow and treeline habitat on Site
Blackcap *Sylvia atricapilla*	Green	Several individuals heard singing throughout the Site

[3] Gilbert et al. (2021) Birds of Conservation Concern in Ireland 4: 2020–2026. *Irish Birds* 43: 1–22

Bats

General Activity Survey – September 2021

A preliminary Bat Survey Report was carried out on Site on the 7th of September 2021. Six bat species were recorded on Site, namely Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Leisler's Bat *Nyctalus leisleri*, Brown Long Eared Bat *Plecotus auritus*, Natterer's Bat *Myotis nattereri*, and Lesser Horseshoe Bat *Rhinolophus hipposideros*. The mature treelines on Site offer Moderate and High bat potential due to high Ivy cover, along with crevices in these trees.

Stone Structures Assessment Survey – September 2021

The old stone walls within the Site were visually assessed and suggest the stone wall structures over 1m were of 'Moderate-High' bat potential.

Landscape Evaluation – September 2021

The landscape is considered to be of local importance for bats due to a very high landscape suitability score for bats. The treelines, hedgerows, scrub and old stone walls containing add to the habitat diversity. The treelines and hedgerows radiating out from the site provide commuting and foraging corridors to other important habitats for bats in the wider landscape.

Dawn, Dusk, and Transect Survey Results – August 2022

Six bat species were recorded on the Site of the Proposed Development between the 1st and the 6th of August 2022, namely Soprano Pipistrelle *Pipistrellus pygmaeus* (134 bat passes), Common Pipistrelle *Pipistrellus pipistrellus* (116 bat passes), Leisler's Bat *Nyctalus leisleri* (92 bat passes), Natterer's Bat *Myotis nattereri* (6 bat passes), Lesser Horseshoe Bat *Rhinolophus hipposideros* (5 bat passes) and Brown Long-eared Bat *Plecotus auritus* (2 bat passes).

The first three species were recorded during bat detector surveys, and static surveillance bat activity levels were indicative of commuting and foraging individuals. The latter three bat species were recorded at a lower level of bat passes, which is to be expected as these three bat species are less common. All bat species were recorded at a *Low* level of bat activity during the static surveillance. However, due to the quiet echolocation calls of Lesser Horseshoe Bat, Natterer's Bat and Brown Long-eared Bat, their presence is significant.

There are no recorded bat roosts within the Site of the Proposed Development. Four of the trees proposed to be felled to facilitate the Proposed Development were recorded as Potential Bat Roosts (PBRs).

An overall *Medium* level of bat activity was recorded on the Site of the Proposed Development and the results indicate that the boundaries and internal network of hedgerows/treelines/scrub on Site are commuting and foraging habitat for local bat populations.

Bat Foraging and Commuting Habitat – August 2022

The northern and eastern boundary of the Site of the Proposed Development that abuts Ennis Golf Course was observed to have active bat commuting and foraging habitat and therefore this habitat is an important linear feature. As outlined in Figure 0.11, extracted from the Tree Survey Report from Arbor Care (2022) accompanying this application, Hedgerow H, which is to be removed to facilitate the Proposed Development, was recorded to be commuting habitat for Lesser Horseshoe Bat and Natterer's Bat, and is therefore considered an important linear feature. The scrub habitat on Site was also recorded to provide foraging habitat to four of the six bat species on Site during the August 2022 surveys.

Newhall and Edenvale Complex SAC and Pouladatig Cave SAC, protected for Lesser Horseshoe Bat, are located 1.7km from the Site of the Proposed Development. If bats from these roosts are commuting

towards the Proposed Development, due to their morphology and echolocation calls, these individuals will commute along dark linear habitats, such as the River Inch. It is likely this watercourse facilitates the movement of this species to the Site of the Proposed Development and to Ennis Golf Course adjacent to the Site. Therefore, it is an important linear habitat to protect, particularly from light spill.

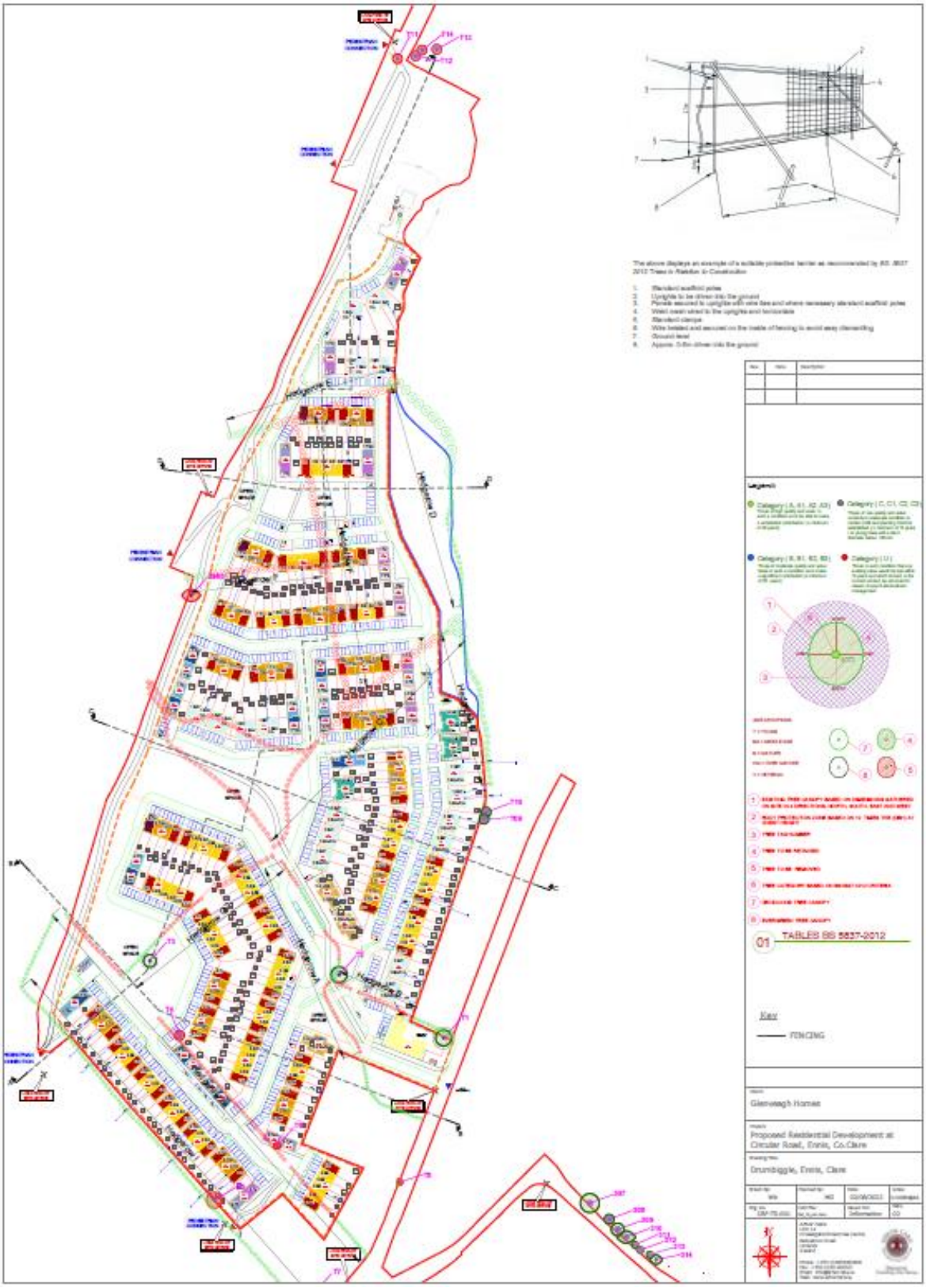

Figure 0.11: Hedgerow habitat to be removed and retained on Site (Arbor Care, 2022)

Marsh Fritillary

The presence and distribution of this species is primarily determined by the occurrence of Devil's-bit Scabious (*Succisa pratensis*) within a mixed sward of varied structure, ideally between 12-25cm in height, often dominated by Purple Moor-grass (*Molinia caerulea*). To qualify as suitable Marsh Fritillary habitat, Devil's-bit Scabious must be recorded within 1m of at least 50% of all random survey points, with the sward height of 75% of the survey points ranging between 10-20cm (NRA, 2009c).

Each of the fields on Site were walked in transects, and random points along these transects were surveyed at approximately 20m intervals. The sward structure at the Site of the Proposed Development is mainly a uniform height above 30cm. No Marsh Fritillary butterflies were encountered on Site on the 19th of May, 8th of June, or the 22nd of July 2022, nor was suitable sward structure for the Marsh Fritillary butterfly recorded within the Site of the Proposed Development.

The Site was also assessed for the presence of Devil's-bit Scabious on the 22nd of July 2022. No evidence of this plant was recorded on Site, and as such, the Site was not found to contain suitable habitat for the Marsh Fritillary.

Common Lizard

There is potential habitat for common lizard within the Site of the Proposed Development in the form of stone walls, hedgerows, and scrub.

Designated Sites, Habitat and Species Evaluation

Fauna which have the potential to utilise habitat within the immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated below in Table 0.12. for their conservation importance. In addition, designated sites and habitats have been evaluated. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b). The rationale behind these evaluations is also provided. The term 'ecological receptors' is used when impacts upon them are likely.

Table 0.12: Evaluation Of Designated Sites, Habitats And Fauna Recorded Within The Site And Surrounding Area.

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated Sites			
SACs & SPAs	International Importance	**Yes**	Weak hydrological pathway via surface water discharge into the Inch River and therefore Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA during the Construction and Operational Phases and via discharges from Ennis North WwTP into River Fergus during the Operational Phase. Hydrogeological pathway to Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA via groundwater contamination during the Construction and Operational Phases. The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex SAC and Pouladatig Cave SAC.

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
NHAs & pNHAs	National Importance	**Yes**	Weak hydrological pathway via surface water discharge into the Inch River and therefore Fergus Estuary And Inner Shannon, North Shore during the Construction and Operational Phases and via discharges from Ennis North WwTP into River Fergus during the Operational Phase. Hydrogeological pathway to Cahircalla Wood, Newhall And Edenvale Complex, Pouladatig Cave, Ballyallia Lake, Lough Cleggan, Fergus Estuary And Inner Shannon, North Shore, Dromore Woods And Loughs, Dromoland Lough, Ballycullinan Lake, East Burren Complex, Poulnagordon Cave (Quin), Lough Gash Turlough, Ballycar Lough, Moyree River System, and Ballyogan Lough via groundwater contamination during the Construction and Operational Phases. The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex and Pouladatig Cave.
Habitats			
Improved Agricultural Grassland (GA1)	Local importance (lower value)	No	Low to moderate diversity grassland, widely present throughout the surrounding landscape.
Treeline (WL2)	Local importance (higher value)	**Yes**	Mature treeline which provides habitat for wildlife and forms an ecological corridor. This habitat may be impacted by the Proposed Development.
Hedgerow (WL1)	Local importance (higher value)	**Yes**	Mature hedgerow which provides habitat for wildlife and forms an ecological corridor. This habitat may be impacted by the Proposed Development.
Stone Walls and Other Stonework (BL1)	Local importance (higher value)	**Yes**	Old stone walls may offer habitat for local lizards and bats and will be impacted by the Proposed Development.
Buildings and Artificial Surfaces (BL3)	Local importance (lower value)	No	Man-made habitat of low biodiversity value.
Scrub (WS1)	Local importance (higher value)	**Yes**	Scrub habitat located within the Site of this Proposed Development. This habitat will be removed to allow for the proposed works.
Wet Grassland (GS4)	Local importance (higher value)	**Yes**	Biodiverse grassland which may be impacted by the Site of the Proposed Development
Fauna			
Eurasian Red Squirrel *Sciurus vulgaris*	Local importance (lower value)	No	This species is primarily associated with broadleaved woodland habitat, and as such, there is no suitable habitat on the Site of the Proposed Development
European Otter *Lutra lutra*	Local importance (higher value)	**Yes**	Hydrological connection to the Inch River and River Fergus
Red Fox *Vulpes vulpes*	Local importance (lower value)	No	These species are not considered to be of conservation concern and are not afforded legal protection in Ireland.

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
West European Hedgehog *Erinaceus europaeus*	Local importance (higher value)	**Yes**	No evidence of these species recorded during field survey. However, this species may utilize the habitats at the Site which will be affected by the Proposed Development, particularly the areas of hedgerow and scrub which will be removed.
Bat Assemblage	County importance	**Yes**	Several bat species were recorded during the general activity survey. The Site also contains foraging and commuting habitats with a number of mature trees with bat roost potential.
Bird Assemblage	Local importance (higher value)	**Yes**	A number of potential breeding species were recorded on site during the June 2021 and May and June 2022 field surveys.
Common Frog	Local importance (higher value)	**Yes**	The Inch River intersects with the north of the Site
Lizard	Local importance (higher value)	**Yes**	Suitable habitat (old stone walls) for this species was recorded on Site, with areas of this wall to be removed as part of the Proposed Development
Aquatic species Assemblage (e.g. fish)	County Importance	**Yes**	Hydrological connection to the Inch River and River Fergus

Predicted Impacts

As per the relevant guidelines, likely significant effects have been assessed for Key Ecological Receptors only, as listed in Table 0.12. An impact is considered to be significant if it is predicted to affect the integrity or conservation status of a KER at a given geographical scale. All impacts are described **in the absence of mitigation**.

Do Nothing Scenario

Under the do-nothing scenario, habitats at the Site would continue to evolve. The hedgerow and treeline habitats would continue to serve as ecological corridors for local wildlife, providing habitat connectivity, as well as nesting and foraging habitat for birds and mammals. The grassland habitat on Site would continue to offer resources to local pollinators, and the scrub habitat would persist in providing habitat for local wildlife.

Construction Phase

Impact on Designated Sites

Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA are hydrologically linked to the Site via surface water discharge to the Inch River and River Fergus. Therefore, there is potential for silt, sediments and/or other pollutants to enter the waterbodies within these European Sites and negatively impact them via water quality deterioration. The potential impact to these European Sites as a result of the Construction Phase of the Proposed Development is considered to be *negative*, *short-term*, *moderate* in the absence of suitable mitigation.

Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA are hydrogeologically linked to the Site via groundwater flow. There is potential, although slight, for pollutants, such as hydrocarbons or a high concentration of suspended solids, to migrate through the

aquifer and surface waterbodies into these European Sites, and negatively impact them via water quality deterioration. The potential impact to these European Sites as a result of the Construction Phase of the Proposed Development is considered to be *negative*, *short-term*, *moderate* in the absence of suitable mitigation.

The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex SAC and Pouladatig Cave SAC. As such, potential loss of foraging and commuting habitat for this species must be considered. In addition, as this species is a "Light Sensitive" bat species, the potential negative impact of lighting, which can act as a barrier to Lesser Horseshoe Bat movement, may also impact on connectivity within the 2.5km foraging zone. As the majority of the internal hedgerows and scrub habitat on Site will be removed during the Construction Phase of the Proposed Development and as there will be an increase to human activity and lighting on Site, the potential impact on this bat species, and therefore the conservation objectives of these SACs, is considered to be *negative*, *permanent*, *moderate* in the absence of suitable mitigation.

Impact on Habitats

The following habitats were listed as KERs for the Site:

Hedgerows (WL1)
Treelines (WL2)
Scrub (WS1)
Stone Walls and Other Stonework (BL1)

The hedgerows and vegetation which bound the north, northwest and southeast of the Site will be retained as part of the Proposed Development, along with two sections of the internal hedgerow habitat within the open spaces within the south of the Site. Areas of the old stone wall on Site will be retained within these sections of linear vegetation. The remaining hedgerows and treelines, and the scrub habitat within the centre of the Site, will be removed as part of the Proposed Development, along with sections of the old stone wall on Site. The removal of this vegetation and stone walls, along with the fragmentation of an ecological corridor, will result in a *negative*, *permanent*, *moderate* impact in the absence of suitable mitigation.

Impacts on Fauna

Non-volant Mammals

The Proposed Development could have a potential *negative*, *permanent*, *moderate* impact at a local level on small mammal species, if they are present, such as Hedgehog, in the absence of mitigation measures, through the removal of scrub habitat within the Site of the Proposed Development. Due to the absence of badger setts at the Site and the abundance of suitable badger habitat within the surrounding environment, any habitat loss associated with the Proposed Development will have a *neutral* impact on badger.

Small mammal species, such as Hedgehog, have the potential to become entangled in construction materials such as netting and plastic sheeting, as well as other waste materials, causing entrapment and injury or death. This constitutes a *negative*, *short-term*, *significant* impact at a *local* level.

Disturbance of mammal species due to noise and dust generated during the Construction Phase, although unlikely, is possible and, as such, a precautionary approach is adopted with these disturbances representing potential *negative*, *short-term*, *slight* impacts at a *local* scale.

Bats

There is potential for a loss of roosting, foraging, and commuting habitat for bats that reside within the vicinity of the Site of the Proposed Development through the decrease of mature linear

vegetation, old stonewalls, and open grassland habitat. This loss and fragmentation of habitat, along with the increased noise and light levels associated with human activity, could have a *negative*, *permanent*, *moderate* impact on local bat species, and particularly on the Lesser Horseshoe Bat where gaps of over 5m are created.

Birds

There will be loss of habitat for birds at the Site of the Proposed Development through the removal of mature, linear vegetation, and open grassland, and disturbance of species during the Construction Phase is possible. This could have a *negative*, *permanent*, *moderate* impact on birds in the locality.

The increased noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause *negative, short-term, slight impacts* to local bird populations.

Lizard

There will be some loss of foraging, nesting and hibernacula habitat for local lizards at the Site of the Proposed Development through the removal of vegetation at the Site, the removal of old stone walls habitat, and disturbance of species during the Construction Phase is possible. This could have a *negative*, *permanent*, *moderate* impact on lizards in the vicinity of the Site.

The increased noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause *negative, short-term, slight impacts* to local lizard populations.

Aquatic Fauna

Surface water discharges associated with the Construction Phase of the Proposed Development may have the potential to cause *negative*, *short-term*, *moderate impacts* to aquatic fauna within the Inch River and River Fergus in the absence of suitable mitigation.

Operational Phase

Impacts on Designated Sites

The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex SAC and Pouladatig Cave SAC. As the Lesser Horseshoe Bat is considered a "Light Sensitive" bat species, during the Operational Phase, there is potential for disturbance to this species commuting through and foraging on the Site through night-time light pollution and increased human activity. This could have a *negative*, *permanent*, *moderate* impact on this bat species, and therefore these SACs, in the absence of suitable mitigation.

Impacts on Habitats

Negative impacts as a result of the Operational Phase of the Proposed Development on terrestrial habitats are not anticipated.

Impacts on Fauna

Non-volant Mammals

During the Operational Phase, there is potential for disturbance to mammals utilising the Site in general through night-time light pollution. This could have a *negative*, *permanent*, *moderate* impact on mammals in the locality.

Bats

All bat species were recorded at a *Low* level of bat activity. However, due to the quiet echolocation calls of Natterer's Bat, Lesser Horseshoe Bat, and Brown Long-eared Bat, their presence is significant.

During the Operational Phase, there is potential for increased human activity, namely via noise and light levels, to have a *negative*, *permanent*, *moderate* impact on bats in the locality.

Birds

No significant effects on birds are anticipated during the Operational Phase.

Aquatic Fauna

No significant effects on fish species are anticipated during the Operational Phase. Mandatory SUDS measures have been incorporated into the design to treat and minimise surface water runoff from the Site.

Cumulative

If the Proposed Development and existing or proposed projects or plans impact on the same KERs, there is potential to lead to cumulative impacts which could be of a higher level of significance. This applies to potential impacts on bats due to the combined loss of suitable commuting and/or foraging habitat in the locality and potential impacts on birds due to the combined loss of nesting or foraging habitat in the locality.

Existing granted planning permissions

There are several existing planning permissions on record in the area ranging from small-scale extensions and alterations to existing residential properties to some larger-scale developments. The larger-scale developments are outlined below:

Planning Application Reference: 17/237

For development which will consist of the following: (1) Demolition of an existing dwelling house and garage;, (2) The construction of 39 No. 2 storey dwelling houses and 3 No. Single storey dwelling houses; (3) The provision of a foul pumping station and associated rising main to existing foul sewer; (4) Retire existing 38Kv overhead lines and associate poles within the proposed development and erect 2 number triple pole 38 Kv cable end poles arrangement as per E.S.B International drawings pg567- D020-070-001-00 at the northern and southern boundary of the site; (5) All ancillary site works and connection to public services. **(Decision: Conditional Permission. Decision Date: 07/12/2017. Appeal Date: 04/01/2018. An Bord Pleanála Decision: Grant Permission with Conditions. Decision Date: 29/05/2018).**

Planning Application Reference: 20/380

For development which will consist of the replacement of 2 no dwelling houses on sites 35 and 36 with one no. detached 2 storey dwelling house including services connections and site works, all to that previously granted under Planning Ref. 17-237. **(Decision: Conditional Permission. Decision Date: 30/07/2020).**

Planning Application Reference: 20/379

For development which will consist of the replacement of 2 no dwelling houses on sites 39 and 40 with one no. detached 2 storey dwelling house including services connections and site works, all to that previously granted under Planning Ref. 17-237. **(Decision: Conditional Permission. Decision Date: 30/07/2020).**

Planning Application Reference: 20/378

For development which will consist of the replacement of 2 no dwelling houses on sites 37 and 38 with one no. detached 2 storey dwelling house including services connections and site works, all to that previously granted under Planning Ref. 17-237. **(Decision: Conditional Permission. Decision Date: 30/07/2020).**

Planning Application Reference: 20/864

For development which will consist of (1) A revised house design on sites 41/42 to that previously granted under Planning Ref. 20-377. The revisions will include for (a) changes to elevations (b) Changes to internal layout (c) First floor accommodation over single storey annex (d) Changes to front gable projection. 2. Services connections and site works, all to that previously granted under planning Ref. 17-237. **(Decision: Conditional Permission. Decision Date: 12/01/2021).**

Planning Application Reference: 18/8009

For the proposed development which will consist of: 1)Demolition of existing farm shed; 2) Refurbishment and conversion of the existing farmyard buildings into 10 No. Housing Units (4 No. 1 Bedroom Units, 5 No. 2 Bedroom Units, 1 No. 3 Bedroom Units); 3) Refurbishment and conversion of the existing coach house into 1 No. Housing Unit (2 Bedroom Unit); 4) Construct 4 No. Terraced Dwelling Houses (2 Bedroom Units) and 5) All associated site works and services. The proposed development is within the curtilage of the Protected Structure of Cahercalla House (RPS No. 045). **(Decision: Conditional Permission. Decision Date: 17/09/2018).**

Planning Application Reference: 21/756

For development at this c.126ha site located at Westpoint, Kilrush Road, Clonroadbeg, Ennis, Co. Clare. The development will consist of: change of use of part of the ground floor level and subdivision and change of use of part of the first floor level within the existing Westpoint building, from retail warehouse to a discount foodstore (including off licence use); Extension of the existing building to include a new lobby area at the north elevation to serve the foodstore (c.29sqm); Extension of the rear of the existing building to accommodate a new single storey loading bay HGV Loading bay ramp (c. 80sqm); resulting in a total gross floor area of 2,270sqm (1,000sqm net retail area for the discount foodstore use; Additional works to accommodate the subdivided first floor unit (no change od use proposed) will include: - Extension of the existing lobby at ground and first floor level at the northern elevation to accommodate a new entrance to the existing unit at the first floor level; - Construction of a new goods lift and circulation stair core (southern elevation) at ground and first floor levels (resulting in a total of c.154sqm of additional new floor area) to serve the reconfigured (separate) existing unit at first floor level; Other works will include: - All associated internal revised layout and external (elevation) alterations to the building at to ground and first floors; - Reconfiguration of the carpark layout including provision of 8 no. cycle paces, removal of the existing service yard and 7 no. carparking paces to provide a revised parking layout; - Erection of 2 no free standing double sided internally illuminated totem signs at the sign entrance, 2 no internally illuminated gable signs, 3 no. shop front signs; - C. 121sqm of solar panels at roof level. **(Decision: Conditional Permission. Decision Date: 09/09/2021. Appeal Date: 05/10/2021. Under Appeal with An Bord Pleanála, decision due 16/02/2022).**

Planning Application Reference: 21/599

For development at this site on lands to the west of Pairc na Coille Retirement Village, in the townland of Drumbiggle, Ennis, County Clare. The development will consist of: 1) Construction of 58 no. residential units comprising: 10 no. four-bed houses, 26 no. three-bed houses, and 22 duplex units comprising 11 no. two-bed ground floor apartment units with 11 no. three-bed house units above. 2) Alterations and upgrade to the existing access road to provide additional footpath, cycle paths and raised traffic tables. 3) Shared communal and semi-private open space, car and bicycle parking, bin stores, site landscaping/boundary treatment works and public lighting. 4) Provision of all associated surface water and foul drainage services and all associated site development works. The application is accompanied by a Natura Impact Statement (NIS). **(Decision: Conditional Permission. Decision Date: 11/03/2022. Under Appeal with An Bord Pleanála, decision due 08/08/2022).**

Planning Application Reference: 22/139

For the proposed building upgrade works to, DSP Intro Office, Block 1, Government Buildings, Kilrush Road, Ennis, Co Clare. Works include: a) Replacement roof finish and rooflight; b) New PV panels to roof; c) New external wall insulation and render; d) Elevational changes to include new doors and entrance lobby screens; e) New service yard to the south-west of the building; f) Changes to the site layout to include EV charge points. All with associated site works. **(Decision: Conditional Permission. Decision Date: 13/04/2022).**

These sites are northeast, east, and southeast of the Proposed Development Site. Given the lack of natural habitat within these proposed sites and distance and urban buffer between the Proposed Development site and the above-mentioned permitted developments, it is concluded that there is no potential for in-combination effects to arise as a result of the Proposed Development on local ecology.

Relevant policies and plans

The following policies and plans were reviewed and considered for possible in-combination effects with the Proposed Development.

Clare Biodiversity Action Plan 2017-2023
Clare County Council Development Plan 2017-2023

The Clare Biodiversity Action Plan 2017-2023 is set out to protect and improve biodiversity, and as such will not result in negative in-combination effects with the Proposed Development. The Clare County Council Development Plan 2017-2023 has directly addressed the protection of biodiversity through specific policies (CDP14.1). The relevant recommendations and mitigation measures have been integrated into the plan.

Therefore, there is no potential for in-combination impacts to arise.

Mitigation Measures

Mitigation by Design

Landscape Plan

The planting of pollinator-friendly flora will improve local biodiversity and increase insect abundance. This will provide additional food for bats and birds at the Site.

The following measures have been incorporated into the landscape design:

The existing hedgerow along the southwest, north, and northeast boundaries of the Site are to be retained as part of the Proposed Development, resulting in the retention of 729m of hedgerow habitat, as will the stone wall habitat along the north and northeast borders of the Site. A section of old stone wall within the northeast of the Site will be lifted and relayed along with a new infill of native hedgerow following the completion of attenuation works.

553m of native hedgerow will be planted on Site, primarily along the majority of the west boundary of the Site of the Proposed Development, with a native wooded area to be planted within the northwest of the Site along the proposed pedestrian access point.

This native woodland is also present within the northeast of the Site, along with proposed shrub planting and a proposed meadow zone. The total area of the native woodland planting proposed will cover 1898m^2.

Approximately 414 specimen trees will be planted throughout the open spaces on Site and along the streets within the Proposed Development. Five feature trees, namely large mature Ash, Oak and Beech trees, will be retained as part of the Proposed Development.

Construction Phase Mitigation

Surface Water

Fuel and Chemical Storage

Appropriate storage facilities will be provided on Site. Areas of high risk include:

- Fuel and chemical storage.
- Refuelling Areas.
- Site Compound; and
- Waste storage areas.

Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.

In order to mitigate against spillages contaminating underlying soils, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).

All tank, container and drum storage areas shall be rendered impervious to the materials stored therein. Bunds shall be designed having regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (2904). All tank and drum storage areas shall, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

Concrete mixer trucks will not be permitted to wash out on Site with the exception of cleaning the chute into a container which will be removed off Site to an authorised facility.

Water will not be discharged to open water courses.

General Protection Measures

All works carried out as part of the Proposed Development will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990 and the contractor will cooperate fully with the Environment Section of Galway City Council in this regard.

Personnel working on the Site will be trained in the implementation of environmental control and emergency procedures. The CEMP and the relevant documents produced will be formulated in consideration of standard best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005.
- BPGCS005, Oil Storage Guidelines.
- CIRIA 697, The SUDS Manual, 2007.
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.
- Construction Industry Research and Information Association CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006).
- CIRIA C648: Control of water pollution from linear construction projects: Site guide (Murnane et al. 2006); and
- Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

The following standard operational measures will protect surface waters during the Construction Phase of the Proposed Development:

- Run-off from the working site or any areas of exposed soil should be channelled and intercepted at regular intervals for discharge to silt-traps or lagoons with over-flows directed to land rather than to a watercourse.
- Pumping of concrete will be monitored to ensure that there is no accidental discharge.
- There will be no mixer washings or excess concrete discharged on Site. All excess concrete is to be removed from Site and all washout of concrete chutes to be captured in a tank which shall be removed offsite for disposal at an authorised wastewater treatment facility.

Silt fences will be appropriately located near watercourses to help prevent untreated surface water run-off entering any watercourse. A buffer zone should remain between the silt fence and the watercourse with natural vegetation left intact.

Any oil and lubricant changes and maintenance will take place offsite.

All open water bodies adjacent to areas of proposed works will be protected by fencing including settlement ponds.

A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.

The developer will ensure that erosion control measures i.e., the silt-traps are regularly maintained during the Construction Phase.

Any imported materials will, as much as possible, be placed on Site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.

Temporary storage areas will be located at least 10m away from any surface water features/drainage ditches etc.; and will be surrounded with silt fencing to filter out any suspended solids from surface water arising from these materials

All containment and treatment facilities will be regularly inspected and maintained.

If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from any water courses or drainage ditches.

If required, refuelling of plant during the Construction Phase will only be carried out at a designated refuelling location. Each location will be fully equipped for spill response. Prior to the commencement of works site personnel will be trained in Environmental and Emergency Spill Response procedures.

Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.

Site personnel working will be trained in pollution incident control response. Emergency silt control & spillage response procedures contained within the CEMP will ensure that appropriate information will be available on site outlining the spillage response procedures and a contingency plan to contain silt during an incident.

Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).

Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste management contractor.

In the unlikely event material becomes contaminated, by for example a fuel spill onsite or a burst / leaking hydraulic hose, a documented procedure for contaminated material will be prepared and adopted by the appointed contractor prior to works commencing on Site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.

Temporary diversions may be used to facilitate working in the dry, the diversion channel should be formed in the dry, and arrangements should be made for authorised personnel to remove all fish from the natural channel before the flow is diverted if fish are present.

Instream machine works should be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.

Instream earthworks must be executed so as to minimise the suspension of solids.

When cofferdams are being kept dry by pumping, the discharge must be routed to an approved settlement facility before return to the river.

Every care must be taken to insure against spillage of concrete or leakage of cement grout within cofferdams.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately by discharge to foul sewer or by tankering off site. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby ditches or watercourses.

Groundwater

Measures set out in Section 0 Surface Water- Fuel and Chemical Storage will serve to protect soil and groundwater.

If encountered, potentially contaminated soil will be stockpiled on site in stockpiles constructed/located/sheeted in a manner to reduce the likelihood of contaminated run-off and that ensures water is contained within the site boundary.

Bats

Tree-felling

Four of the trees to be felled to facilitate the Proposed Development have been identified as Potential Bat Roosts (PBR). The following measures have been extracted from the Bat Assessment report (Bat Eco Services, 2022) accompanying this application:

> *"A Phase Two PBR survey is recommended for the four trees identified as a PBR and proposed to be felled. This should be undertaken at least one month prior to tree felling in order to propose a tree felling plan in conjunction with tree contractors.*
>
> *Alternative roosting sites (i.e. summer bat boxes) will be erected prior to the removal of trees. These are recommended to be erected 6 months prior to tree felling to allow local bat populations to become aware of them prior to removal of the trees.*
>
> *Trees proposed to be removed, should be felled on mild days during the autumn months of September, October or November or Spring months of February and March (felling during the spring or autumn months avoids the periods when the bats are most active).*
>
> *An assessment of trees according to their PBR value determines the methodology of felling. Trees with PBR Category 1 are highly suitable for roosting bats and require more intensive procedures prior to felling. The trees identified within the survey area are PBR Category 2. The procedure to fell these is as follows: Any Ivy covered trees which require felling will be left to lie to 24 hours after cutting to allow any bats beneath the cover to escape. Any PBR with deadwood should be surveyed prior to felling and felling should entail slow dismantling of the tree (i.e. large dead limbs to be removed prior to felling of main tree)."*

Birds

Any clearance of vegetation will be carried out outside the main breeding season, i.e., 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, this vegetation will be checked for bird nests, and if any are noted during this evaluation prior to removal, a derogation licence will be required from the NPWS. Similarly, a derogation licence will be required for the removal of nests if found during the pre-clearance survey. This would note the section of habitat that is a nest site, the precise location within the hedgerow/trees, the species of bird present; and also elaborate the means by which the birds would be protected prior to nest removal. If eggs have been laid, the nest will be protected until the young have fledged after which time the nest could be destroyed (under licence from the NPWS only). This would also require further compensatory measures including nesting sites for birds if practicable.

Small Mammals

As best-practice, all construction-related waste on site e.g., plastic sheeting, netting etc. will be kept in a designated area on site and kept off ground level to protect Hedgehogs from entrapment and death. These measures will also act to mitigate potential negative impacts on any other small mammal species potentially utilising the Site.

Works likely to cause disturbance during hibernation – such as removal of hibernation habitats, including dense scrub – **will not take place during November to March**.

Lizards

In order to minimise the risk of site clearance and construction works disturbing, or causing the mortality of Common lizard, a site-specific survey for common lizard will be undertaken prior to the construction phase commencing. Appropriate mitigation measures will be recommended by the surveyor, however, they are likely to include the following, extracted from NRA (n.d.):

> Any habitats identified as potentially suitable for lizard (e.g., meadow or scrub habitat) will be removed during the winter period, where possible, avoiding potential Common lizard hibernacula sites (dry sites which provide frost-free conditions e.g. underground small mammal burrows, piles of dead wood or rubble)

Where this is not possible and clearance must be undertaken during the active season (March through to September, inclusive), vegetation will be cut first to approximately 15cm, and then to the ground, under supervision of an ecologist. This will allow the opportunity for lizards to be displaced by the disturbance and leave the affected area

Potential hibernacula sites identified by the surveyor will be removed during the active season (March through to September, inclusive) under the supervision of an ecologist, when they are less likely to be in use by torpid lizards.

Reduction of Noise and Dust related impacts

Reduction of noise impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, the following measures will be implemented:

Selection of plant with low inherent potential for generating noise.

Siting of plant as far away from sensitive receptors as permitted by site constraints.

Avoidance of unnecessary revving of engines and switch off plant items when not required.

Keep plant machinery and vehicles adequately maintained and serviced.

Proper balancing of plant items with rotating parts.

Keep internal routes well maintained and avoid steep gradients.

Minimise drop heights for materials or ensure a resilient material underlies.

Use of alternative reversing alarm systems on plant machinery.

Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.

Limiting the hours during which site activities likely to create high levels of noise are permitted.

Appointing a site representative responsible for matters relating to noise.

Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the Site of the Proposed Development will be reduced to a minimum.

Reduction of dust related impacts

The following general dust control measures will be followed for the duration of the Construction Phase of the Proposed Development and will ensure no significant dust related impacts occur to nearby sensitive receptors including local faunal species.

In situations where the source of dust is within 25m of sensitive receptors screens (permeable or semi-permeable) will be erected.

Haulage vehicles transporting gravel and other similar materials to site will be covered by a tarpaulin or similar.

Access and exit of vehicles will be restricted to certain access/exit points.

Vehicle speed restrictions of 20km/hr will be in place.

Bowsers will be available during periods of dry weather throughout the construction period.

During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil thereby reducing the amount of dust.

Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly or as needed if exposed during dry weather.

Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.

Equipment should be washed at the end of each workday.

Hard surfaced roads will be wet swept to remove any deposited materials.

Unsurfaced roads will be restricted to essential traffic only.

If practical, wheel-washing facilities should be located at all exits from the construction site.

Dust production as a result of site activity will be minimised by regular cleaning of the site access roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.

Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

The frequency of cleaning will be determined by the site agent and is weather and activity dependent

The height of stockpiles will be kept to a minimum and slopes should be gentle to avoid windblown soil dust.

The following will be dampened during dry weather:

Unpaved areas subject to traffic and wind

Stockpiles

Areas where there will be loading and unloading of dust-generating materials

Under no circumstances should wastewater from equipment, wheel or surface cleaning enter the surface water drainage network.

Invasive Species

While no invasive species were recorded on the Site of the Proposed Development, it is recommended that if any non-native/invasive flora species are encountered at the Site, they should be controlled/removed as per the appropriate best-practice guidelines and in consultation with the relevant qualified invasive species professional. Removal and disposal should be carried out in accordance with appropriate guidelines such as TII (formerly NRA) Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010), with consideration given to the prevention of spread of these plants.

Biosecurity

The following will be adhered to, to avoid the introduction of invasive species to the Proposed Development site.

Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present.

All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species

Operational Phase Mitigation

Bats

The following measures have been extracted from the Bat Assessment report (Bat Eco Services, 2022) accompanying this application and will be included in the Lighting Design Plan:

Lighting

"*Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018). Consultation was undertaken with the lighting specialists to reduce the potential impact on local bat populations.*

All luminaires used will lack UV/IR elements to reduce impact.

LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.

A warm white spectrum (<2700 Kelvins (i.e. 2200 Kelvins) will be used to reduce the blue light component of the LED spectrum).

Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.

Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.

Only luminaires with an upward light ratio of 0% and with good optical control will be used.

Luminaires will be mounted on the horizontal, i.e. no upward tilt.

Any external security lighting will be set on motion-sensors and short (1min) timers.

As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.

Any external lighting for the Proposed Development should strictly follow the above guidelines and these should be strictly implemented during Construction and Operation phase of the Proposed Development.

Additional measures were also recommended:

Removal of specific luminaires to prevent light spillage on the boundary with the golf course."

Bat Box Scheme

"The total number of bat boxes required to mitigate for general conservation of local bat populations:

4 summer bat boxes (Schwegler Woodcrete 1FF bat box or equivalent – source www.nhbs.com or www.veldshop.nl) to be erected on mature trees within the Proposed Development site.

Bat boxes will be erected prior to construction works. The bat specialist will erect the bat boxes with assistance from the contractor. Some general points that will be follow include:

Straight limb trees (or telegraph pole) with no crowding branches or other obstructions for at least 1 metre above and below position of bat box.

Diameter of tree should be wide and strong enough to hold the required number of boxes.

Locate bat boxes in areas where bats are known to forage or adjacent to suitable foraging areas. Locations should be sheltered from prevailing winds.

Bat boxes should be erected at a height of 4-5 metres to reduce the potential of vandalism and predation of roosting bats.

Locations for bat boxes should be selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes. Therefore the bat boxes are to be erected mature trees to the rear of the proposed development site and away from public street lighting."

Lesser Horseshoe Bat Conservation Measures

"Due to the presence of Lesser Horseshoe Bats within the survey area and the fact that the Proposed Development is within 2.5km radius of two SACs, it is important that additional measures are undertaken to conservation local Lesser Horseshoe Bat populations. These measures will entail the following:

Compensatory planting for the removal of linear habitats.

Compensatory planting for the removal of scrub habitats.

Specific measures to reduce lighting impacts.

Lesser Horseshoe Bat conservation zone – zone of land along a linear strip to the north of the Proposed Development site and connected to the boundary of the Inch River. This area has been selected because it is outside the Lighting Plan zone and it is adjacent to the Inch River which is deemed as the likely commuting route for Lesser Horseshoe Bats to the Proposed Development area. This river also allows direction commuting to lands with the Ennis Golf Course where Lesser Horseshoe Bat activity was also recorded.

This area is approximately 20m wide and 170m long and it is proposed that the following measures are undertaken: Erection of Day Roost."

A Day Roost consists of a "*small structure building of concrete block (externally plastered) with a natural slate roof and bitumous felt. It is designed according to VWT Day Roost recommendations and full details of the plans are provided in the appendices*" of the Bat Assessment Report accompanying this application.

"*The provision of such features within the 2.5km radius of Lesser Horseshoe Bat SACs is considered by The Vincent Wildlife Trust (VWT) as an important component to the support network for maternity and hibernation roosts.*

Dark free zone connected to Inch River no lighting permitted withing this area.

Landscaping in vicinity of Day Roost and Inch River.

Approximately 200m of hedge planting (Hawthorn).

Approximately 10 small trees (e.g. Rowan, Birch and Crab Apple).

Landscape Design

"It is recommended that native tree, shrub, and plant species are included in the landscaping plan. It is recommended that night-scented planting is also undertaken to encourage foraging areas for local bat populations. As such, night scented-floral species, including Honeysuckle Lonicera periclymenum and Star Jasmine Trachelospermum jasminoides, will be included within the proposed hedgerows and areas of ornamental planting on Site, as outlined within the Landscape Design Plan, to provide foraging habitat for local bats.

It is essential that the northern and eastern boundary with the Ennis Golf Course is protected. Any gaps or opportunity to undertaken planting to increase the height and width of this boundary should be undertaken and planting should be with native tree and shrub species. "The retention of the hedgerows along this boundary, along with the proposed compensatory woodland planting and native infilling to these hedgerows, as outlined in the Landscape Design Plan, will protect this ecological corridor.

Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant.

Monitoring of the bat populations utilising the Site of the Proposed Development is recommended post-construction works. The methods recommended by Bat Eco Services for monitoring include:

> *"Inspection of bat boxes within one year of erection of bat box scheme/rocket box. Register bat box scheme with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years.*
>
> *Monitoring of Day Roost: Monitoring should involve: Inspection of internal space for evidence of bat usage once per year for two years. Static surveillance for a minimum of 10 days/year to record any bat activity during the summer months in Year 2. Installation of a temperature data logger for 2 year surveillance.*
>
> *Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. A full summer bat survey is recommended post-works.*
>
> *Specific monitoring is recommended in relation to the proposed lighting scheme to determine that a level of <1 Lux is achieved along the boundaries of the Proposed Development site."*

Residual Impacts

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 0.13 provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

Table 0.13: Summary Of Potential Impacts On KER(S), Mitigation Proposed And Residual Impacts.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Newhall and Edenvale Complex SAC **Pouladatig Cave SAC**	International Importance	Loss of foraging habitat for Lesser Horseshoe Bat within 2.5km radius of these SACs	Negative	Local	Permanent	Moderate	Retention of hedgerow habitat along the north, northeast, and southwest boundaries of the Site. Retention of stonewalls within the north and northeast of the Site. Native hedgerow planted along the west boundary as part of the project design, with a native wooded area to be planted within the northwest of the Site. Specific mitigation measures regarding Lesser Horseshoe Bats, as specified above.	Negative, short-term, slight impact due to loss of scrub and semi-natural habitats
Hedgerows (WL1) **Treelines (WL2)** **Scrub (WS1)** **Stone Walls and Other Stonework (BL1)**	Local Importance (higher value)	Habitat loss during the Construction Phase of the Proposed Development	Negative	Local	Permanent	Moderate	Retention of hedgerow habitat along the north, northeast, and southwest boundaries of the Site. Retention of stonewalls within the north and northeast of the Site. Native hedgerow planted along the west boundary as part of the project design, with a native wooded area to be planted within the northwest of the Site	Negative, short-term, slight impact due to loss of scrub and semi-natural habitats

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Small Mammals	Local Importance (higher value)	Mortality during Construction Phase. Loss of sections of potential foraging and commuting habitat. Disturbance due to noise and dust generated during Construction Phase.	Negative	Local	Permanent Permanent Short-term	Significant Moderate Slight	Best practise construction waste storage/handling measures to be implemented. Work likely to cause disturbance during hibernation (removal of hibernation habitats such as dense scrub) will not take place during November to March. Retention of hedgerow habitat along the north, northeast, and southwest boundaries of the Site. Retention of stonewalls within the north and northeast of the Site. Native hedgerow planted along the west boundary as part of the project design, with a native wooded area to be planted within the northwest of the Site. Construction related noise control/minimisation measures to be implemented.	Negative, long-term, slight impact at local scale due to loss of semi-natural habitat and change in landuse.
Bat assemblage	County Importance	Loss of potential foraging, roosting and commuting habitat. Increased noise and lighting levels associated with the Operational Phase of the Proposed Development	Negative	Local	Permanent	Moderate	Retention of hedgerow habitat along the north, northeast, and southwest boundaries of the Site. Retention of stonewalls within the north and northeast of the Site.	Negative, long-term, slight impact due to increased lighting, removal of linear habitats and presence of

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
							Native hedgerow planted along the west boundary as part of the project design, with a native wooded area to be planted within the northwest of the Site. Mitigation regarding tree-felling as specified above. Mitigation regarding wildlife-friendly lighting as specified above. Specific mitigation measures regarding Lesser Horseshoe Bats, as specified above.	light-sensitive species on Site.
Breeding-Bird assemblage	Local Importance (higher value)	Loss of potential foraging and nesting habitat. Disturbance due to noise generated during Construction Phase.	Negative	Local	Permanent Short-term	Moderate Short-Slight	Planting of shrub and tree species to take place as part of project design. No removal of vegetation to take place during the nesting season. Construction related noise control/minimisation measures to be implemented.	

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Aquatic Fauna	County Importance	Deterioration in water quality due to surface water contamination associated with the Construction Phase	Negative	Local	Short-term	Significant	Mitigation measures to protect groundwater as outlined in 0	Neutral
Lizard	Local importance (higher value)	Loss of nesting/hibernacula and foraging habitat during the Construction Phase. Disturbance due to noise generated during Construction Phase.	Negative	Local	Permanent Short-term	Moderate Slight	Retention of north and west hedgerows and stonewalls, and planting of shrub and native tree species to take place as part of project design. Construction related noise control/minimisation measures to be implemented	Neutral

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Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

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CHAPTER 10

Noise and Vibration

August 2022

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10 Noise & Vibration

10.1 Introduction

This chapter assesses the likely noise and vibration impacts associated with the proposed development at Ballymacaula, Circular Road, Ennis, Co. Clare. The proposed development will consist of mix of residential units, a creche, landscaping and amenity areas and all associated infrastructure works. A full description of the development can be found in Chapter 2.

10.1.1 Author Information and Competency

This chapter was prepared by Dominic Wright holds a Diploma in Music Technology and has completed a IOA Diploma in Acoustics and Noise Control. He has previous knowledge and experience in the world of audio engineering and is experienced in both noise modelling and environmental noise surveying. The chapter has been co-authored and reviewed by Jennifer Harmon, Principal Acoustic Consultant in AWN Consulting. Jennifer holds a BSc in Environmental Science from University of Ulster and a Diploma in Acoustics and Noise Control from the Institute of Acoustics (IOA) and is a full member if the IOA. Jennifer has over 20 years' experience in environmental noise and vibration impact assessment for a wide range of project types across Ireland.

10.1.2 Reference to Guidelines Relevant to Discipline

There are no statutory standards in Ireland relating to noise and vibration limit values for construction works or for environmental noise relating to the Operational Phase. In the absence of specific statutory Irish guidelines, the assessment has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating to noise and / or vibration impact for environmental sources. These are summarised below:

- ANC, IOA & CIEH (2017). ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development
- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 – 2) (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472–1) (BSI 2008);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS 8233) (BSI 2014c);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (BSI 2019);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018 (hereafter referred to as the Noise Regulations);
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;

- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (ISO 1996);
- ISO 1996-1: 2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (ISO 2016);
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (hereafter referred to as ISO 1996 – 2) (ISO 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1998).
- Clare County Council Noise Action Plan 2018-2023

In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter.

- Draft Advice Notes for Preparing Environmental Impact Statements (EPA 2015); and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022).

10.1.3 Methodology

The study has been undertaken using the following methodology:

- Environmental noise surveys have been conducted in the vicinity of the proposed development to assess the existing baseline noise environment;
- A review of published noise data from the EPA for road traffic noise has been undertaken to provide additional information relating to the baseline noise levels in the surrounding area;
- A review of the most applicable standards and guidelines has been carried out in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development which are discussed in the following sections;
- Predictive calculations have been performed to determine the noise and vibration impact on the nearest sensitive locations during the construction phase;
- Predictive calculations have been performed to determine the noise impact on the nearest noise-sensitive locations during the operational phase;
- A schedule of mitigation measures has been proposed for both the construction and operational phases to reduce, where necessary, the outward noise and vibration from the development; and;
- The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements, for additional noise mitigation to ensure a suitable internal noise environment for residential amenity.

10.1.4 Assessment Criteria

10.1.4.1 Construction Phase – Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. Construction noise sources include construction plant and machinery and construction related traffic on surrounding roads.

BS 5228-1 is referenced here for the purposes of setting appropriate construction noise limits for the development. This is the most widely accepted standard for this purpose in Ireland. This document sets out a method whereby construction noise thresholds are determined based on ambient noise level. This method is summarised in Table 10.1.

Table 10.1: Threshold of Potential Significant Effect at Dwellings.

Assessment Category and Threshold Value Period	Threshold value (dB)		
	Category A [A)]	Category B [B)]	Category C [C)]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends [D)]	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.

In accordance with the standard, ambient measured noise levels should be rounded to the nearest 5 dB and construction noise limits are then set according to the category definitions above. This method is commonly referred to as the 'ABC' Method.

10.1.4.2 Construction Phase – Vibration

There are two aspects to the issue of vibration that are considered for this development: the risk of cosmetic or structural damage to buildings; and human response to vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human response are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

There is no published statutory Irish guidance relating to the maximum permissible vibration levels for either building response. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Vibration (BS 5228 – 2); and
- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration (BS 7385-2).

BS 5228-2 and BS 7385 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

The standard also notes that below 12.5mm/s PPV, the risk of damage tends to zero. Historically important buildings that are difficult to repair might require special consideration on a case by case basis, but buildings of historical importance should not be assumed to be more sensitive unless they are structurally unsound. If a building is in an unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance. The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed buildings, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. This is summarised in Table 10.2 below.

Table 10.2: Transient Vibration Guide Values for Cosmetic Damage.

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. **Residential or light commercial buildings.**	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Unsound or Vulnerable Structures	6mm/s	

Note 1: Values referred to are at the base of the building.

Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

BS 5228-2 also provides guidance relating to the human response to vibration. Guidance is provided in terms of PPV in mm/s since this parameter is routinely measured when monitoring the structural effects of vibration. The potential human response at different vibration levels, as set out in BS 5228-2, is summarised in Table 10.3.

Table 10.3: Guidance on Human Response to Vibration Levels.

Vibration level Note A) B) C) (mm/s)	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.

B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.

C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

Table 10.4 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS 5228 – 2, DMRB Noise and Vibration 2020 and associated EPA significance ratings.

Table 10.4: Human Response Vibration Significance Ratings

Criteria	Likely Effect (DMRB)	Significance Rating
≥10 mm/s PPV	Major	Significant to Very Significant
≥1 to <10 mm/s PPV	Moderate	Moderate to Significant
≥0.3 to <1 mm/s PPV	Minor	Not Significant to Slight
≥0.14 to 0.3mm/s PPV	Negligible	Imperceptible to Not significant
Less than 0.14 mm/s PPV		Imperceptible

10.1.4.3 Construction Phase – Traffic

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: DMRB Noise and Vibration 2020 and the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 10.5 relates changes in traffic noise levels to impact on human perception based on the guidance contained in these documents.

Table 10.5: Classification of Magnitude of Noise Impacts in the Short-term.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

10.1.4.4 Operational Phase – Building Services Plant Noise

In the case that heating, cooling or other active process is carried out on site, there is the potential for additional plant noise to be introduced to the environment. To assess this, reference is made here to the British Standard BS 4142: 2014 +A1 2019. This standard can be used to assess the impact of a new continuous source to a residential environment and is used commonly by local authorities in their standard planning conditions and also in compliant investigations.

The method for assessing plant noise set out in BS 4142 is based on the following definitions:

"Specific noise level, $L_{Aeq,T}$" is the equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T;

"Rating level, $L_{Ar,T}$" is the specific noise level plus adjustments for the character features of the sound (if any);

"Residual noise level, $L_{Aeq,\ T}$"	is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval, T;
"Background noise level, $L_{A90,\ T}$"	is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

Adjustments to the rating level are appropriate where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention. In these cases, penalties are applied of either an additional 2 dB, 4 dB or 6 dB depending on how perceptible the tone is at the noise receptor.

The background level should then be subtracted from the rating level. The greater this difference, the greater the magnitude of the impact will be, in general. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, while a difference of around +5 dB is likely to be an indication of an adverse impact (as referred to in BS 4142), depending on the context.

For residential units within the proposed development, acceptable noise levels both internally and externally, can be determined by referring to the British Standard BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings. The following guidance, summarised in Table 10.6, is provided in this standard for internal ambient noise levels in dwellings:

Table 10.6: Guidance on Indoor Ambient Noise Levels for Dwellings.

Activity	Location	Daytime (07:00 to 23:00hrs)	Night (23:00 to 07:00hrs)	Derived External Levels
Resting	Living room	35 dB $L_{Aeq,\ 16hr}$	-	50 dB $L_{Aeq,\ 16hr}$
Dining	Dining room	40 dB $L_{Aeq,\ 16hr}$	-	55 dB $L_{Aeq,\ 16hr}$
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hr}$	30 dB $L_{Aeq,\ 8hr}$	50 dB $L_{Aeq,\ 16hr}$ (45 dB $L_{Aeq,\ 8hr}$ at night)

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233, and represent the appropriate noise level at the external façade of the building.

10.1.4.5 Operational Phase – Additional Traffic on Surrounding Roads

Vehicular movement to and from the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration and the EPA, 2022 EIAR guidance document.

Table 10.7 relates changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.7: Classification of magnitude of noise impacts in the long term.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0	Inaudible	No impact	Imperceptible
0.1 – 2.9	Barely Perceptible	Negligible	Not significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very significant

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

10.1.4.6 Operational Phase – Vibration

The development is residential in nature and there are no vibration sources associated with the proposed development. Therefore, there will be no outward impacts associated with vibration for the operational phase, and accordingly such impacts have been scoped out.

10.1.4.7 Inward Noise Impact Criteria

The Professional Guidance on Planning & Noise (ProPG) (2017) published by the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH) is generally considered as a best practice guidance for assessing the noise risk of sites for new residential development and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

Stage 1 - Comprises a high level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,

Stage 2 is a systematic consideration of the following four elements:

- Demonstrating a good acoustic design process;
- Observing internal noise level guidelines;
- Undertaking an external amenity area noise assessment; and
- Consideration of other relevant issues.

A summary of the ProPG approach is illustrated in Figure 10.1.

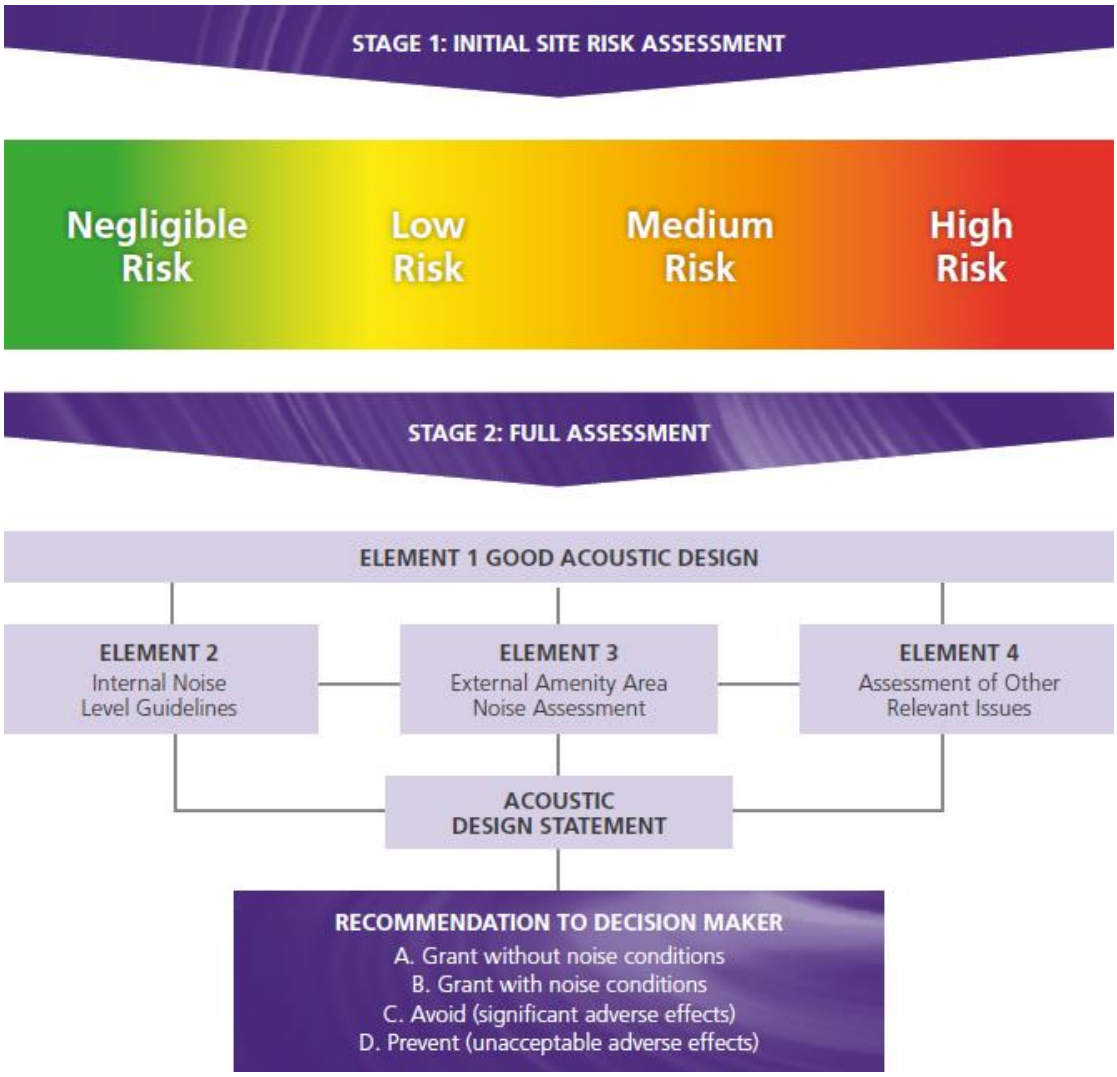

Figure 10.1: ProPG Approach (Source: ProPG)

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 10.2 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Paragraph 2.9 of ProPG states that,

> *"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."*

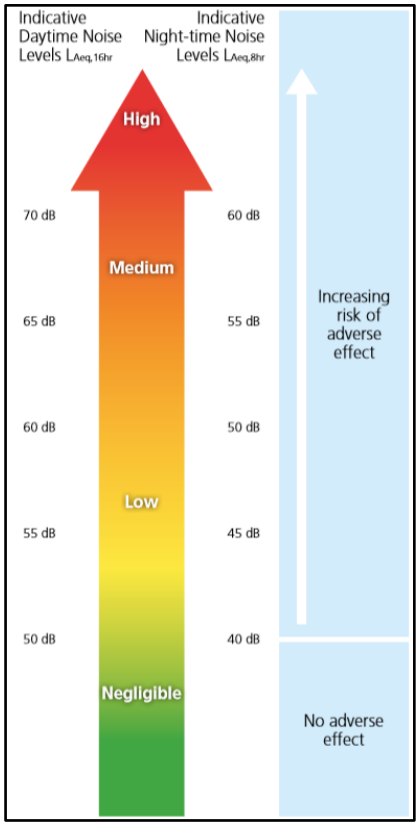

Figure 10.2: Initial Noise Risk Assessment

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233: 2014. The recommended indoor ambient noise levels are set out in Table 10.6 above and are based on annual average data. The noise risk assessment for the site is set out in Section 10.5.3.

10.1.5 Difficulties Encountered in Compiling Information

There were no difficulties encountered in compiling this assessment.

10.2 Description of Existing Environment

10.2.1 Site Location

The subject lands are located parallel to the N85 in Ennis, Co. Clare as shown in Figure 10.3

To the south, the site is bound by a mix of low – density residential houses and the R474 road. To the southeast the site is bound the R474 with further residential properties beyond that.

To the north and north east there are agricultural lands and the lands of Ennis golf club

To the west much of the site is bound by the national road N85, beyond which lies agricultural land, the inch river and properties located in Shanaballa.

Figure 10.3: Proposed Site Layout

The prevailing noise environment has been characterised through baseline noise surveys and a desktop review of available published noise mapping. Both are discussed in the following sections.

10.2.2 Baseline Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

10.2.2.1 Survey Locations

The noise measurement locations were selected to represent the noise environment at the nearest noise sensitive locations (NSLs) surrounding the proposed development. The selected locations are shown in Figure 10.4 and described as below:

- **AN1 –** Attended noise measurements undertaken at the southwestern end of the site close to the Ballymacaula View housing development.
- **AN2 –** Attended noise measurements undertaken near the south easterly boundary of the site near residential NSLs bordering the R474.
- **AN3 –** Attended noise measurements undertaken near the western edge of the site bordering the N85.
- **UN1 –** Unattended noise measurements undertaken near the western edge of the site, at a location representing the proposed housing development taking into account the inward impact noise from the N85.

Figure 10.4: Noise Monitoring Locations

10.2.2.2 Survey Periods

Attended Measurements were conducted from 12:40 to 15:40 on Friday 4 March 2022 and Unattended Measurements from 12:15 on Friday 4th of March to 18:30 on Monday 7 March 2022. Over the course of the survey the weather was generally dry, calm, and mild. Temperatures were approximately 8°C, wind speeds were approximately 2 to 3 m/s on the 4th of march and similar weather conditions prevailed throughout the rest of the period for the Unattended Measurement.

10.2.2.3 Personnel and Instrumentation

AWN carried out the attended noise survey and installed and collected the unattended noise monitoring equipment. The following instrumentation was used in conducting the noise surveys:

Table 10.8: Instrumentation Details

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	RION NL-52	575782	July 2021
Sound Level Meter	RION NL-52	1076328	August 2020
Sound Calibrator	Bruel & Kjaer 4231	2394086	March 2021

10.2.2.4 Measurement Parameters

The noise survey results are presented in terms of the following parameters.

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

10.2.2.5 Noise Survey Results

Noise level measurements of 15 minutes duration were taken at location AN1 to AN3. The results are presented in Table 10. 10.9 to Table 10.12. It should be noted that a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A10} and L_{A90} parameters.

Table 10.9: Summary of Measurement Results for Location AN1

Time	Subjective Impression of Noise Environment	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
12:40	▪ Occasional traffic noise from R474 ▪ Birdsong ▪ Site Work from Ballymacaula View housing development works. ▪ Distant road traffic noise from N85 audible in local R474 traffic lulls.	47	69	50	42
13:45	▪ Occasional traffic noise from R474 ▪ Birdsong ▪ Distant reversing alarm and general site work noise from Ballymacaula View housing development works. ▪ Distant N85 road traffic noise	45	59	47	40
14:45	▪ Occasional traffic noise from R474 ▪ Birdsong ▪ Sitework noise from housing development lesser than previous measurement rounds. ▪ Distant road traffic from N85	46	65	48	43
Average		**46**	**--**	**48**	**42**

At location AN1 noise levels were in the range 45 to 47 dB $L_{Aeq,15min}$ and 40 to 43 dB $L_{A90,15min}$. The main contributors to noise build-up were local traffic, distant road traffic and intermittent site works from Ballymacaula View housing development.

Table 10.10: Summary of Measurement Results for Location AN2

Time	Subjective Impression of Noise Environment	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
13:00	▪ Traffic Noise from R474 dominant ▪ Birdsong ▪ Distant bell rang for short period 10 minutes into measurement	54	64	59	40
14:05	▪ Traffic Noise from R474 dominant when traffic passing ▪ Birdsong ▪ Distant emergency service alarms at start of measurement	55	66	59	41
15:05	▪ Traffic Noise from R474 dominant when vehicles passing ▪ Birdsong ▪ Distant construction noise from Ballymacaula View housing development.	47	59	49	43
Average		**53**	**--**	**56**	**41**

At location AN2 noise levels were in the range 47 to 55 dB $L_{Aeq,15min}$ and 40 to 43 dB $L_{A90,15min}$. The main contributors to noise build-up were local traffic, distant road traffic and Birdsong.

Table 10.11: Summary of Measurement Results for Location AN3

Time	Subjective Impression of Noise Environment	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
13:25	▪ Road traffic noise from N85 dominant. ▪ Birdsong	55	65	58	46
14:25	▪ Road traffic noise from N85 dominant. ▪ Distant construction noise	55	68	58	49
15:25	▪ Road traffic noise from N85 dominant. ▪ Birdsong	58	69	61	53
Average		**56**	**--**	**59**	**49**

At location AN3 noise levels were in the range 55 to 58 dB $L_{Aeq,15min}$ and 46 to 53 dB $L_{A90,15min}$. The main contributors to noise build-up were road traffic from the N85 and birdsong.

The results of the unattended monitoring location UN1 are presented below in Table 10.12.

Table 10.12: Summary of Measurement Results for Location UN1

Date	Period	Measured Ambient Noise Levels, dB		
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$
04/03/2022	Day (07:00 – 19:00)	65	68	55
	Evening (19:00-23:00)	64	68	50
	Night (23:00 – 07:00)	56	56	33
05/03/2022	Day (07:00 – 19:00)	64	68	53
	Evening (19:00-23:00)	63	67	47
	Night (23:00 – 07:00)	56	57	35
06/03/2022	Day (07:00 – 19:00)	63	66	50
	Evening (19:00-23:00)	60	64	42
	Night (23:00 – 07:00)	54	50	32
07/03/2022	Day (07:00 – 19:00)	62	66	53
Averages	Day (07:00 – 19:00)	**64**	**67**	**53**
	Evening (19:00-23:00)	**62**	**66**	**47**
	Night (23:00 – 07:00)	**55**	**54**	**33**

The main contributors to noise build-up at UN-1 were road traffic from the N85.

Figure 10.5 presents the distribution of the magnitude of L_{AFmax} events during the night period at noise monitoring location UN1.

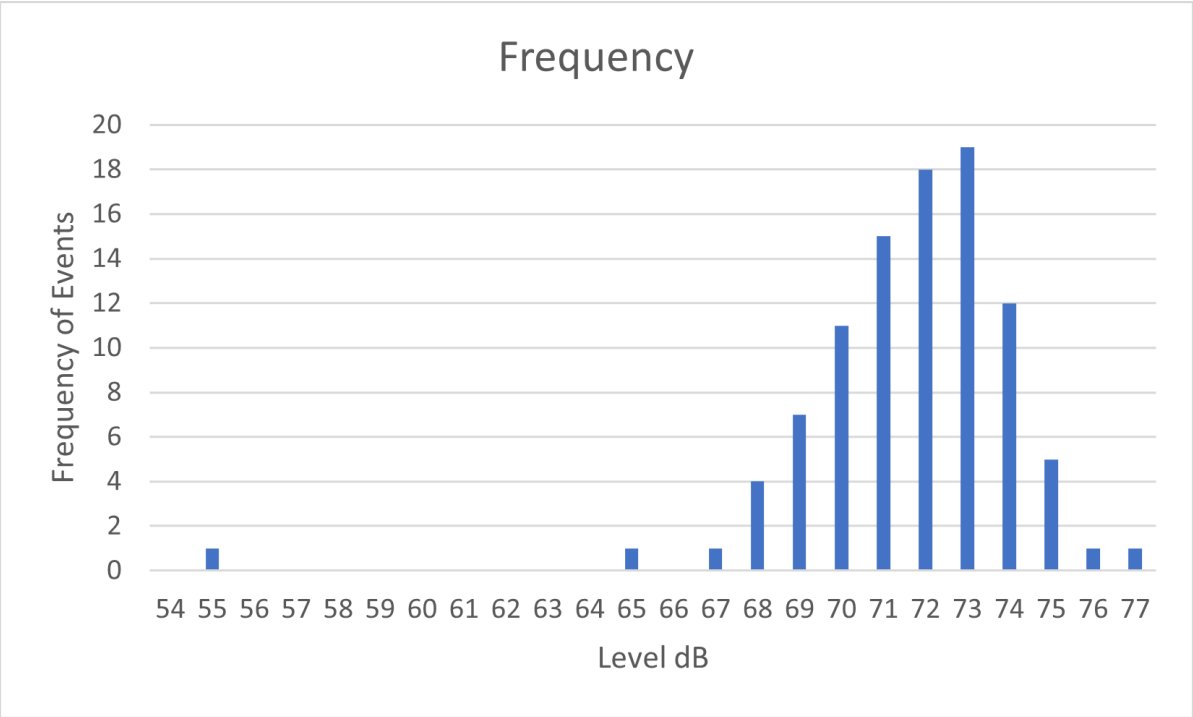

Figure 10.5: Distribution of The Magnitude of Night Time L_{AFmax} Noise Events at Location UN1

Using the data collated from location UN1 relating to L_{AFmax} events, it can be seen that the proposed would exceed the criteria for a negligible noise risk along the northern site boundary (relation to ProPG in section 10.1.4) due to the occurrence of more than 10 L_{AFmax} events exceeding 60dB during the night time period. Further discussion on the potential inward impact is addressed in Section 10.3.4.

10.2.3 Desktop Review of Noise Mapping

A desktop review of publicly available data has been undertaken to further characterise the baseline noise environment in the study area. Reference has been made to the most recent Round 3 noise maps published by the Environmental Protection Agency (EPA) (http://gis.epa.ie) for road traffic noise within Clare County Council. The published noise maps are provided for the overall day-evening-night period in terms of L_{den} and the L_{night} parameters, defined below.

L_{den} is the 24-hour noise rating level determined by the averaging of the L_{day} with the $L_{evening}$ (plus a 5 dB penalty) and the L_{night} (plus a 10 dB penalty). L_{den} is calculated using the following formula, as defined within the Noise Regulations:

$$L_{den} = 10log\left(\frac{1}{24}\right)\left(12 * \left(10^{\frac{Lday}{10}}\right) + 4 * \left(10^{\frac{Levening+5}{10}}\right) + 8 * \left(10^{\frac{Lnight+10}{10}}\right)\right)$$

Where:

L_{day} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the day periods of a year. The 12 hour daytime period is between 07:00hrs and 19:00hrs

$L_{evening}$ is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year. The four-hour evening period is between 19:00hrs and 23:00hrs

L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year. The eight-hour night-time period is between 23:00hrs and 07:00hrs.

Figures 10.6 and 10.7 present the mapped road traffic noise levels in the vicinity of the development site as reported in the Clare County Council Noise Action Plan 2018-2023 in terms of the L_{den} and L_{night} parameters. The N85 Road is partially mapped to the north and south of the site, however the extent of the N85 along the western site boundary is not mapped. Roads which are mapped are those with traffic volumes in excess of approximately 8,000 vehicles per day. Along the mapped sections of the N85 north and south of the site indicate that at distances of approximately 50m from the road edge, traffic noise levels are within the 55 to 59 dB L_{den} noise contour and reducing further moving away from the road to below 55 dB L_{den}..

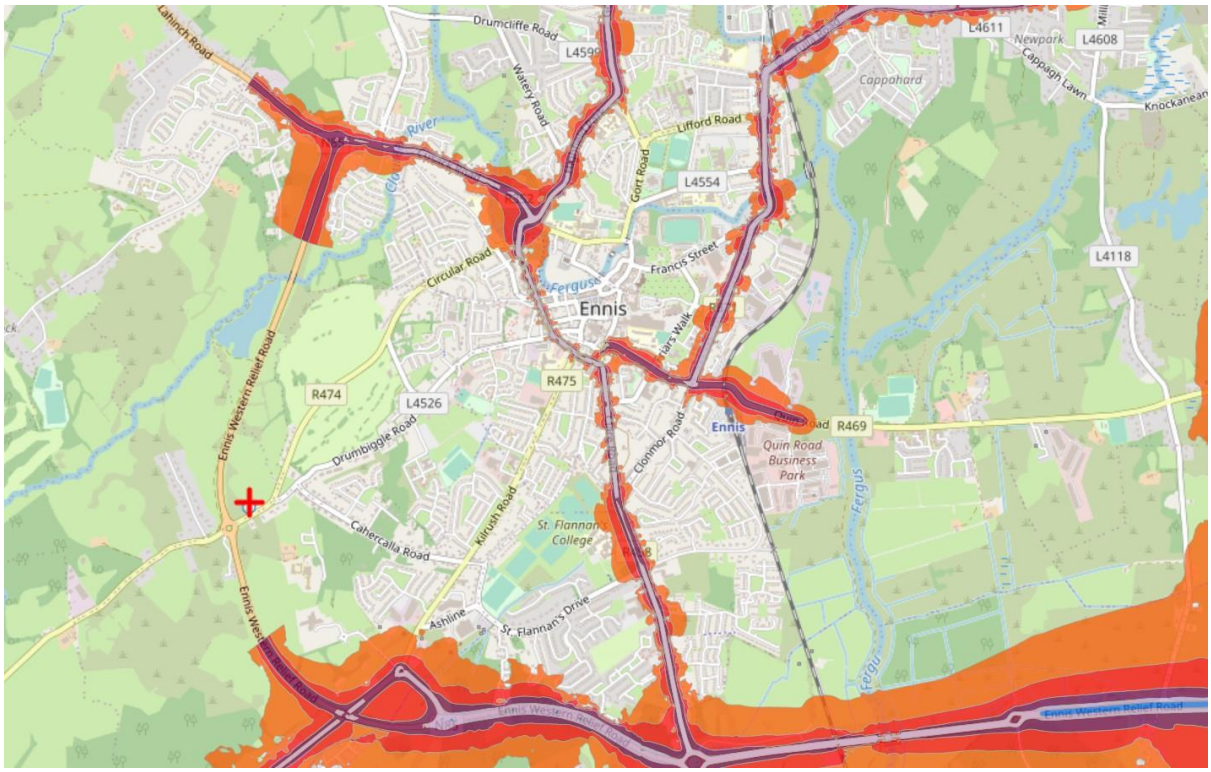

Figure 10.6: Mapped dB L_{den} Traffic Noise Level within vicinity of proposed development (Source: http://gis.epa.ie)

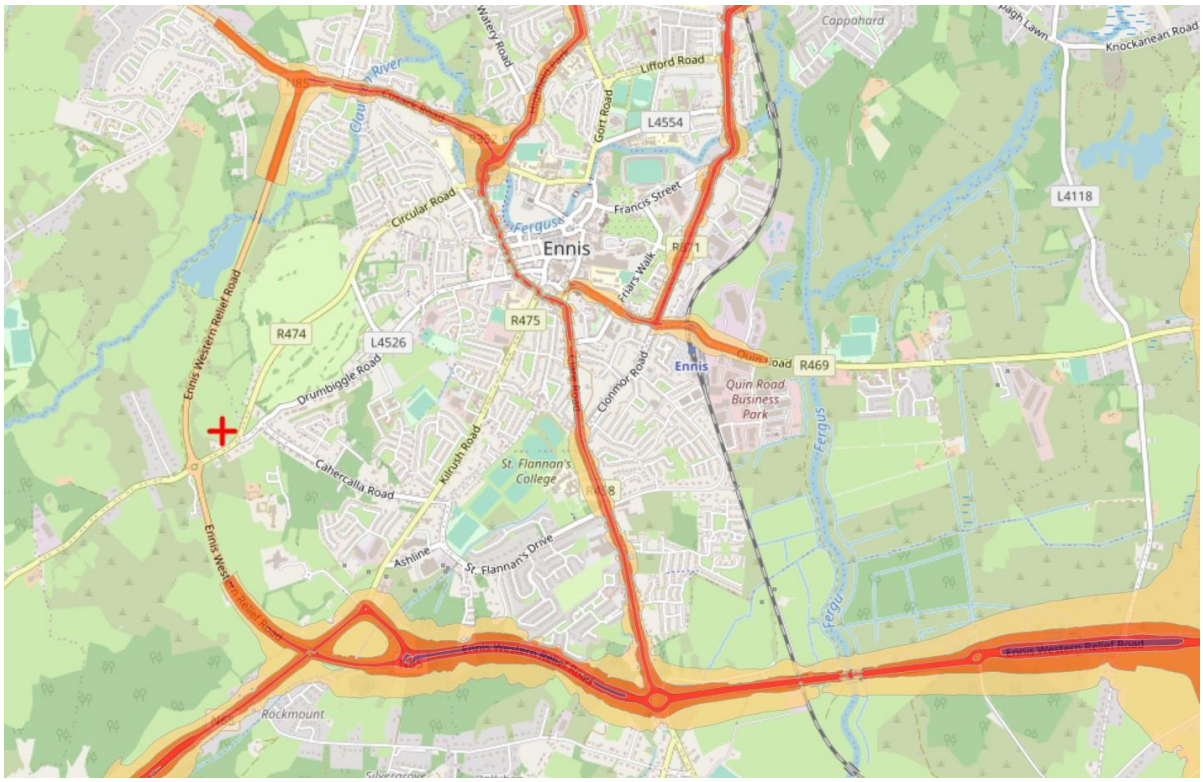

Figure 10.7: Mapped dB L_{night} Traffic Noise Level within vicinity of proposed development (Source: http://gis.epa.ie)

Along the mapped sections of the N85 north and south of the site indicate that at distances of approximately 20m from the road edge, traffic noise levels are within the 50 to 55 dB L_{night} noise contour and reducing further moving away from the road to below 50 dB L_{night}.

10.3 Predicted Potential Impacts

10.3.1 Do Nothing Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged resulting in a neutral and local impact in the long-term.

10.3.2 Construction Phase

10.3.2.1 Construction Phase – Noise

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery used to construct the various phases in addition to Heavy Goods Vehicles (HGVs) movement to, from and around the site. However, impacts during this phase are short-term in duration.

The nearest NSLs to the site are residential dwellings along the R474 Road to south / south-eastern site boundary at a distance of approximately 10m from the red line boundary and approximately 20m to the closest structural works. Along the western boundary, the closest NSLs are situated at Ballymacaula View at a distance of approximately 40m from closest structural works. However current construction at Ballymacaula view will introduce new residential NSLs closer to the red line boundary. They will fall into the approximate region of 15 to 20m from the closest structural works. To the north and west of the site, the closest NSLs are a significant distance from the proposed development and therefore are estimated to not experience any significant noise impacts during the construction phase of the development.

Thresholds for significant noise from construction can be determined by referring to Table 10.1 (BS 5228-1) and the baseline ambient noise levels (Section 10.2), as outlined in the assessment criteria section. These thresholds are shown in Table 10.13. Based on the prevailing noise environment measured, the construction noise thresholds are defined from Category A. A night-time threshold is not included as construction work will not be taking place at night.

Table 10.13: Significance thresholds for construction noise.

Noise Sensitive Location	Period	Significance Threshold
Residential properties southeast, east and west of site.	Evenings and weekends (D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays 07:00–23:00 Sundays.	55 dB $L_{Aeq,T}$
	Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65 dB $L_{Aeq,T}$

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to mobile plant, loading lorries and material handling (dozers, tracked excavators and wheeled loaders), cranes and road pavers are typically in the range of 70 to 80 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a combined worst-case scenario is assumed of 5 no. such items with a sound pressure level (SPL) of 75 dB at 10 m operating simultaneously along the closest works boundary has been used. This would result in a total noise level of 82 dB at 10 m and an equivalent combined sound power level of 110 dB $L_{w(A)}$.

Given the nature of the proposed works which will include standard residential house building techniques across the site, the cumulative construction noise level is considered to represent construction activities likely to be encountered during the earlier stages of construction when site clearance and any excavation works involving earth moving machinery will be employed. This worst-case scenario is a robust assumption made for developments of this size, on the basis that it is unlikely that more than 5 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other at all times. In reality items of construction plant and machinery will be operating at varying distances from any one NSL. Once the ground preparation works have been completed, a large portion of the work will involve manual labour and cranes with lower overall noise levels.

As noted above the closest NSL are located to the south-east, east and west of the site boundary at distances of 15 to 40m from the main site works associated with constructing the residential units and access road. Figure 10.8 identifies the closest NSLs external to the proposed development.

Figure 10.8: Closest NSLs in relation to red line boundary

Guidance on the approximate attenuation achieved by site hoarding is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when a barrier blocks the line of sight between the source and receiver.

The closest NSLs along the R474 Road to the south /south east of the are single storey dwellings, hence a 10 dB screening correction has been accounted for assuming a standard 2.4m site hoarding will be used around sensitive site boundaries where NSLs are in proximity. To the south-west of the site, the closest NSLs are two storey, hence a 5 dB correction is applied to account for upper floor windows.

Table 10.14 presents the calculated noise levels at various distances based on the assumed sound power level. The values are calculated with the screening correction for construction site hoarding in

place as standard along the east and southern boundaries. Predictions are based on the utilisation of construction associated plant for a minimum of 66%[1] of a working day (i.e. 8hrs of a 12hr day).

Table 10.14: Potential construction noise levels at varying distances

Description of Noise Source	Sound Power Level (dB L_w(A))	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)						
		10	15	20	30	50	80	100
5 no. items each with SPL of 75 dB at 10 m simultaneously – with 10 dB screening from hoarding	110	70	67	64	61	56	52	50
5 no. items each with SPL of 75 dB at 10 m simultaneously – with 5 dB screening from hoarding	110	75	72	69	66	61	57	55

The calculated noise levels in Table 10.14 indicate that construction noise levels at the closest NSLs along the south and south-eastern boundary can be controlled to within the construction daytime significance thresholds with construction site hoarding in place. This indicates a negative, moderate and short term impact at the closest noise sensitive locations along this boundary.

Construction noise levels at the closest existing NSLs along the south-western site boundary (at 40m from the works) are within the construction daytime significance thresholds with construction site hoarding in place. This indicates a negative, moderate and short term impact at the closest noise sensitive locations along this boundary.

New properties currently under construction along the south-western site boundary have the potential to be within 15 to 20m of the closest site works. The calculated noise level at this distance is 69 to 72 dB $L_{Aeq.}$ As discussed above, this relates to a scenario whereby up to 5 items of plant are in operation at this distance and accounts only for partial screening. This scenario is unlikely to be experienced over the full duration of the works, hence this indicates a negative, moderate to significant and temporary impact to negative, moderate and short-term impact at these properties.

10.3.2.2 Construction Phase – Traffic

All construction related vehicles accessing and egressing the site will do so from the site entrance along the R474. Chapter 11 of this EIAR discusses the potential effect of traffic on the local area. Their assessment deems that the increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction phase of the development which will be developed in phases.

Construction traffic travelling to the proposed development site will use the N85 Road and R474 Circular Road. A Traffic Management Plan (which will be completed by the Contractor appointed to

[1] This estimate assumes that the plant will operate for approximately 6.5 hours over the proposed 10 hour working period which equates to a 66% on time over a daytime period or 40 minutes over a 1 hour period. The dynamic nature of construction sites is such that this is deemed to be a conservative estimate..

the project) for the construction stage will identify haulage routes and restrictions as appropriate in discussion with the Local Authority.

In terms of potential noise impact, traffic volumes would need to increase by 25% or greater along the designated network to result in a negligible (1 dB) increase in traffic noise level. The impact is therefore determined to be negative, short-term and not significant.

10.3.2.3 Construction Phase – Vibration

In terms of the potential vibration impact during the construction phase, there are no significant excavations into rock associated with this application hence no significant intrusive ground breaking or excavation work will occur. The closest sensitive buildings to these works are located at 15 to 20m from the development site. At these distances vibration magnitudes associated with any of the construction activities on site will be orders of magnitude below those associated with any perceptible vibration to building occupants referred to in Table 10.4 resulting in an imperceptible to not significant and temporary impact.

All construction works are orders of magnitude below limits values associated with any form or cosmetic or structural damage to buildings or structures referred to in Table 10.2 including any structurally vulnerable buildings.

10.3.3 Operational Phase

Once the development is operational, the potential noise impacts to the surrounding environment will be minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (estate vehicle movements, children playing etc.) and hence no significant impact is expected from this area of the development site.

The main potential noise impact associated with the proposed development is considered therefore to relate to the generation of additional traffic to and from the site as a result of the new residential element. Once operational, there are no vibration sources associated with the development site.

The review of standards and guidelines in Section 10.1.4 will be used here to assess the potential impact of the proposed development during the operational phase.

10.3.3.1 Operational Phase – Building Services Plant Noise

There are no sources of mechanical or electrical plant associated with the building types across the development with potential to emit audible noise levels beyond the building immediate boundary (i.e. individual heat recovery systems serving the residential units).

There is provision for a pump station within the development. The closest noise sensitive locations to these structures are the proposed residential units within the development site at distances of the order of 10 – 15m. Once the structure is well sealed and designed to control tonal noise emissions, operational noise levels from these structures should be low and not give rise to any significant noise levels beyond their immediate structure. Given the distance to the nearest noise sensitive properties, noise levels at the nearest noise sensitive locations should be well controlled. Noise impacts associated with these units will be imperceptible at existing NSLs external to the site.

During the detailed design stage, operational noise levels associated with these units will be reviewed to ensure noise levels at the nearest noise sensitive buildings do not exceed the internal noise levels within Table 10.6.

10.3.3.2 Operational Phase – Additional Traffic on Surrounding Roads

In terms of potential noise impact, traffic volumes would need to increase by 25% or greater along the surrounding road network to result in a negligible (1 dB) increase in traffic noise level.

Table 10.15 summarises the traffic flow in terms of the Annual Average Daily Traffic (AADT) and percentage HGV along the adjacent roads with and without the proposed development, and presents the calculated change in noise level between both scenarios. The assessment year presented in 2039 representing the future design year.

Table 10.15: Change in Traffic Noise Levels with Proposed Development in place – Design Year 2039

Road or Junction	2039 – Do Nothing (Including Permitted Developments)	2039 – Do Something With proposed Development	Calculated traffic noise increase, dB
	AADT	AADT	
N85	17,155 (5% HGVs)	17,454 (5% HGVs)	+0.1
R474 Circular Road	7,822 (3% HGVs)	8,748 (3% HGVs)	+0.5

The change in noise level along the adjacent and internal roads is imperceptible (Refer to Table 10.7). The resultant impact is neutral, imperceptible and long-term.

10.3.4 Cumulative

Below are the relevant projects assessed for the cumulative impacts of the proposed development.

Table 10.16: Relevant Projects for Cumulative Impact

Reference No.	Address	Project Description	Distance from Subject Site	Status	Likely cumulative effects
Clare County Council Ref: 22/139	DSP Intreo Office, Block 1, Government Buildings, Kilrush Road, Ennis, Co Clare	Permission for the proposed building upgrade works to, DSP Intro Office, Block 1, Government Buildings, Kilrush Road, Ennis, Co. Clare. Works include: A) Replacement roof finish and rooflight: B) New PV panels to roof and rooflight b) New PV Panels to roof C) New external wall insulation and render D) Elevation changes to include new doors and entrance lobby screens E) New Service Yard to the south-west of the building F) Changes to the site layout to include EV charge points All associated site works	1km	Under Review by Clare County Council	No cumulative effects relating to noise or vibration due to distance and sufficient screening from proposed development

Reference No.	Address	Project Description	Distance from Subject Site	Status	Likely cumulative effects
Clare County Council Ref: 21/599 and ABP Ref: 313217-22	Drumbiggle Ennis Co Clare	Permission for the construction of 58 no. residential units at Drumbiggle, Ennis, Co. Clare. Alterations and upgrade to the access road and associated site development works. The application is accompanied by a Natura Impact Statement (NIS)	200m	Under Appeal with An Bord Pleanála, decision due 08th August 2022	No likely cumulative effects relating to noise or vibration due to distance and sufficient screening from proposed development. Construction noise levels likely to be at least 10 dB below those discussed in Section 10.3.2 hence no increase expected over those calculated.
Clare County Council 21/756 and ABP Ref: 311569-21	Westpoint, Kilrush Rd Clonroadbeg Ennis Co Clare	Permission for a change of use from retail warehouse to discount foodstore, extension to the rear and north of the existing building resulting in a total gross floor area of 2,270m^2	1km	Under Appeal with An Bord Pleanála, decision due 16 February 2022	No cumulative effects relating to noise or vibration due to distance and sufficient screening from proposed development
Clare County Council Ref: 18/8009	Cahercalla Ennis Co. Clare	Permission for demolition of existing farm shed, refurbishment and conversion of existing farmyard building into 10 no. housing units, refurbishment and conversion of the existing coach house into 1 no. housing unit and construct 4 no. terraced dwelling houses within the curtilage of the Protected structure of Cahercalla House.	640m	Permitted by Clare County Council on the 17th August 2018	No cumulative effects relating to noise or vibration due to distance and sufficient screening from proposed development
Clare County Council Ref: 17/237, ABP Ref: 300590-18	Ballymacaula Drumbiggle Ennis Co. Clare	Permission for the construction of 39 no. 2 storey dwelling houses and 3 no. single storey dwelling houses, the provision of a foul pumping station and associated raising main to existing foul sewer, retire existing 38Kv overhead lines and associated poles within the proposed development and erect 2 number triple pole 38Kv cable end poles.	20m	Permitted by An Bord Pleanála on the 29th May 2018	Potential for cumulative effects during construction period if construction periods take place at the same time. A potential increase of the levels predicted in section 10.3.2 by a worst case of +3dB. No traffic effects in relation to noise are predicted.

As summarised in the table above one development have the potential to result in a cumulative construction noise effects at the noise sensitive locations identified in this report in the event both developments are under construction at the same time. These potential cumulative effects are temporary to short-term in nature.

10.4 Mitigation Measures

10.4.1 Construction Phase Mitigation

BS 5228-1: 2009+A1 :2014 Parts 1 and 2 provide guidance on noise and vibration control in the context of construction. The control of noise from construction works can be divided into two categories:

- Controlling the noise at source; and
- Controlling the spread of noise.

Mitigation measures that will be employed in order to control construction noise at its source include the following:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Minimise drop height of materials;
- Start-up plant and vehicles sequentially rather than all together;
- The normal operating hours of the site will be adhered to. This also applies to the movement of plant onto and around the site;
- The plant and activities chosen to carry out the construction work will be the quietest available means of achieving the required purpose;
- Modifications may be made to plant and equipment, if appropriate, for noise attenuation purposes, provided the manufacturer has been consulted. For example, a more effective exhaust silencer may be fitted to a diesel engine;
- As far as is reasonably practicable, sources of significant noise will be enclosed provided that ventilation and potential hazards to operators have been considered;
- Plant and noisy activities will be located away from noise-sensitive areas where practicable and sources of directional noise should be oriented away from noise-sensitive areas; and
- All plant and equipment will be regularly maintained (increases in plant noise are often indicative of future mechanical failure).
- Mitigation measures that will be employed in order to control the spread of construction noise include the following:
- The distance between noise sources and noise-sensitive areas will be increased as much as is reasonably practicable; and
- Where noise control at source is insufficient and the distance between source and receiver is restricted, screening will be implemented. Based on the calculated construction noise levels in Section 10.5.1, the use of a standard 2.4m high hoarding is recommended along the southern, south-eastern and western site boundaries.

10.4.2 Operational Phase Mitigation

To ensure that acceptable operational noise levels at the nearest noise sensitive locations are achieved, the following mitigation measures will be considered during the detailed design stage.

10.4.2.1 Additional Vehicular Traffic on Surrounding Roads

During the operational phase of the development, noise mitigation measures with respect to the impact of traffic from the development are not deemed necessary.

10.4.2.2 Building Services Plant

With consideration at the detailed design stage the selection and location of plant items will ensure that noise emissions to sensitive receivers both external and within the development itself will be within the relevant criteria, therefore no further mitigation is required.
Considering that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site.

10.4.3 Monitoring

10.4.3.1 Construction Phase

During the demolition and construction phase, spot check noise monitoring shall be carried out by the contractor to ensure that the recommended threshold levels set out in Table 10.17 or any conditioned noise limits are not exceeded. There are no significant vibration sources associated with the construction phase and no vulnerable structures identified adjacent to the site, hence vibration monitoring is not proposed during this phase.
Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise and be located a distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources.

10.4.3.2 Operational Phase

No monitoring is considered necessary for the operational phase.

10.5 Residual Impacts

This section describes the degree of environmental change that will occur after the proposed mitigation measures have taken effect.

10.5.1 Construction Phase

During the construction phase of the project there is the potential for temporary to short-term noise effects on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable.

Likely noise and vibration effects during the construction phase will be local, negative, moderate and short-term.

10.5.2 Operational Phase

10.5.2.1 Additional Vehicular Traffic on Surrounding Roads

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall effects from noise contribution of increased traffic is considered to be of neutral, imperceptible and long-term effect to nearby noise sensitive locations.

10.5.2.2 Building Services Plant

Noise levels associated with operational plant are expected to be well within the adopted day and night-time noise limits at the nearest noise sensitive properties considering the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise effects from this source will be of neutral, not significant, long-term impact.

10.5.3 Inward Impact Assessment

The development lands in question are in proximity to the N85 national road to the west of the site. Noise from the road has the potential to impact the residential developments proposed for the site itself.

10.5.3.1 Existing Noise Climate

The existing noise climate within the development lands was surveyed and the results summarised in Section 10.2 of this chapter. The results of the survey have indicated that highest noise levels are experienced along the western and north-western site boundary of the site which borders the N85 Road. Further east of the N85 road traffic noise levels are significantly reduced.

In order to determine the inward noise impact for noise sensitive properties proposed as part of the development, it is necessary to determine the internal noise levels within the proposed buildings. These can then be compared against appropriate internal noise criteria from BS 8233, as summarised in Section 10.1 (Table 10.6).

It is possible to calculate internal noise levels within the residential properties proposed within the site, taking account of the existing and future potential noise environment, proposed constructions and the relevant sound insulation provided by the building elements (i.e. walls, roof, glazing etc.).

10.5.3.2 Stage 1: Noise Risk Classification of the Site

Using the noise measurements collected from position UN1, noise levels for proposed residential dwellings along the western boundary have been established. Road traffic noise levels measured across the western boundary of the site were between 62 and 65dB $L_{Aeq,16hr}$ during daytime periods and between 54 to 56dB $L_{Aeq,8hr}$ during the night time periods.

Giving consideration to the measured noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the site falls into the low medium noise risk category along this boundary and would fall into the low risk category within the remainder of the site.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. In the case of the AWN survey the L_{AFmax} noise levels we measured at less than 80dB during the night with the highest sporadic events recorded at a high of 77dB L_{AFmax}. ProPG guidance considers 20 night events over 80dB to be a high risk, therefore this site would be considered a medium risk in terms of maxima events.

ProPG states the following with respect to low and medium risks:

Low Risk At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development

Medium Risk *As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of*

noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

Given the above it can be concluded that the development site may be categorised as a *Low to Medium Risk* and as such an Acoustic Design Strategy will be required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."

Therefore, following the guidance contained in ProPG does not preclude residential development on sites that are identified as having medium risk noise levels. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

10.5.3.3 Stage 2: Noise Assessment

Element 1 – Good Acoustic Design Process

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating or reducing noise levels from relevant sources;
- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
- Assess the viability of alternative solutions; and,
- Assess external amenity area noise.

In the context of the proposed development, each of the considerations listed above have been addressed in the following subsections.

Relocation or Reduction of Noise from Source

Noise sources incident upon the development site have been determined to be low to medium risk. Control of noise at source from road traffic is outside of the site boundary and hence is outside of the scope of the proposed development.

Planning, Layout and Orientation

As part of the project design, the overall majority of residential buildings within the proposed development are set back from the road boundary. The closest properties to the road will experience highest potential noise levels with reduced noise levels further into the site. The properties along the western boundary are orientated such that rows of residential buildings are mostly perpendicular to the road, thus reducing the number of noise sensitive facades closest to the road boundary. The buildings themselves screen the external amenity areas.

Select Construction Types for meeting Building Regulations

The design of all buildings is required to meet with all relevant parts of the Building Regulations. The specific detail of which will be completed at detailed design stage. In terms of the building sound insulation, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade.

Consideration will therefore be given to the provision of sound insulation performance for glazing and ventilation systems, where required to achieve suitable internal noise levels within the development. Achievement of acceptable internal ambient noise levels does not form part of building regulation requirements. However, this will be incorporated into the building design in line with best practice and compliance with the guidance set out in ProPG.

Impact of noise control measures on fire, health and safety etc.

The good acoustic design measures that have been implemented on site, e.g. locating properties away from the road are considered to be cost neutral and do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

The main noise source incident on the site is road traffic. This source is largely mitigated by the distance to the building, screening by the on-site building and orientation of building layouts to avoid overlooking of sensitive amenity spaces to the main noise sources. All the measures listed above aid in the control of noise intrusion to the buildings across the development site.

Assess External Amenity Area Noise

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Based on the prevailing noise environment, the distance of the proposed buildings from the adjacent road network, screening from proposed buildings, and the location of gardens and external amenity areas noise levels within the site, the external amenity areas are well within this range.

Summary

Considering the constraints of the site, insofar as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

Element 2 – Internal Noise Levels

As is the case in most buildings, the windows, or glazed elements, of the building envelope are typically the weakest element from a sound insulation perspective. BS 8233 is the relevant standard that applies to indoor ambient noise levels. The guidance provided in this standard is summarised in Table 10.6 of this report. In this instance, the facades along the western boundary of the site (Ref Figure 10.9) will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 10.17. It is recommended that where wall vents are specified for buildings marked for

glazing type red along this boundary , they achieve a sound insulation performance noted in Table 10.17.

Table 10.17: Sound Insulation Performance Requirements for Western Façade Buildings, marked red. (dB)

Glazing Specification	dB Rw	Vents , dB $D_{n,e,w}$
Red	34	36

The remainder of the site do not have a marked up acoustic rating due to the low noise risk and hence once a standard double glazed unit which achieves a sound insulation performance of at least 30 dB R_w is achieved, no further consideration is needed to these facades. The glazing illustrated in Figure 10.9 relate to bedrooms and living spaces. For staircore and windows to non-sensitive spaces, lower performance glazing is sufficient.

Figure 10.9: Properties with Enhanced Sound Insulation to Glazing

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

As part of the detailed design of the residential blocks, the specifics in terms of octave band SRI performances will be established to take account of the finalised room layouts, room volumes and glazing dimensions

Element 3 – External Amenity Areas

External noise levels within the public open spaces and private gardens across the development site are within the recommended range of noise levels from ProPG of between 50 and 55 dB $L_{Aeq,16hr}$. It is

considered that the objectives of achieving suitable external noise levels is achieved within the overall site.

10.6 References

- Draft Advice Notes for Preparing Environmental Impact Statements (EPA 2015); and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022).
- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (BSI 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (BSI 2008);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BSI 2014c);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BSI 2019);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHA 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018;
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO 1996);
- ISO 1996-1: 2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (ISO 2016);
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (ISO 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (UK Department of Transport 1998).
- Clare County Council Noise Action Plan 2018-2023

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

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CHAPTER 11

Air Quality and Climate Change

August 2022

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11.1 Introduction

This chapter assesses the likely air quality and climate impacts associated with the proposed Strategic Housing Development at Ballymacaula, Circular Road, Ennis, Co. Clare. The proposed development will consist of mix of residential units, a creche, landscaping and amenity areas and all associated infrastructure works. A full description of the development can be found in Chapter 2.

11.1.1 Author Information and Competency

This chapter was completed by Ciara Nolan, a Senior Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds an MSc. (First Class) in Environmental Science from University College Dublin and has also completed a BSc. in Energy Systems Engineering. She is an Associate Member of both the Institute of Air Quality Management (AMIAQM) and the Institution of Environmental Science (AMIEnvSc). She has over 5 years of experience in air quality consultancy. She has prepared air quality and climate impact assessments for numerous EIARs for a range of projects including commercial, residential, industrial, pharmaceutical and data centre developments.

11.1.2 Reference to Guidelines Relevant to Discipline

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013)
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014)
- UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality (UK Highways Agency, 2019a)
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019b)

11.1.3 Consultation

Consultation with relevant bodies was carried out as part of the planning process. A submission from the Health Service Executive (HSE) was received on 11/02/22 which included considerations in relation to air quality and climate. The letter notes that emissions of dust during the construction phase have the potential to temporarily impact local residents and that these impacts should be assessed as part of the assessment. In relation to climate the letter states that the applicant should ensure that climate considerations are integrated into the design of the development. Any measures that conserve energy consumption and reduce carbon emissions should be outlined within the EIAR. In addition, the vulnerability of the project to climate change should be assessed. The points outlined in the submission from the HSE have been incorporated into this assessment and are outlined in detail in the following sections.

11.1.4 Methodology

11.1.4.1 Criteria for Rating of Impacts

Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. The limit values for NO_2, PM_{10} and $PM_{2.5}$, are relevant to this assessment (see Table 11.1). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 11.1).

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the TA Luft limit of 350 mg/(m^2*day) to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction of the proposed development.

Table 11.1: Air Quality Standards Regulations

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the Act as the '*national transition objective*'. The Act made provision for, *inter alia*, a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019a). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a). The plan contains similar elements as the 2019 CAP and aims to set out how Ireland can reduce our greenhouse gas emissions by 51% by 2030 (compared to 2018 levels) which is in line with the EU ambitions, and a longer-term goal of to achieving net-zero emissions no later than 2050. The 2021 CAP outlines that emissions from the Built Environment sector must be reduced to 4 – 5 $MtCO_2e$ by 2030 in order to meet our climate targets. This will require further measures in addition to those committed to in the 2019 CAP. This will include phasing out the use of fossil fuels for the space and water heating of buildings, improving the fabric and energy of our buildings, and promoting the use of lower carbon alternatives in construction.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019 (Government of Ireland 2019b) followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) in July 2021 (Government of Ireland, 2021b). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans 'for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'. The 2021 Climate Act will also 'provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'. The 2021 Climate Act defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

11.1.4.2 Construction Phase Methodology

Air Quality

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2014) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site specific mitigation required. The use of UK guidance is considered best practice in the absence of applicable Irish guidance.

The major dust generating activities are divided into four types within the IAQM guidance (2014) to reflect their different potential impacts. These are: -

- Demolition.
- Earthworks.
- Construction.
- Trackout (movement of heavy vehicles).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site specific mitigation to be determined.

Construction phase traffic also has the potential to impact air quality. The UK DMRB guidance (UK Highways Agency, 2019a), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII (2011) in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT and therefore does not meet the above scoping criteria. As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

11.1.4.3 Operational Phase Methodology

Air Quality

The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2022) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. Traffic data for the proposed development was provided by Tobin Consulting Engineers. This included details of the traffic for the proposed development in addition to the cumulative traffic associated with the proposed development, existing developments and committed developments that are permitted but not yet constructed. The UK Highways Agency DMRB scoping criteria detailed in Section 11.1.4.2 was used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. The proposed development will result in a maximum increase of 926 AADT, on Circular Road which is below the 1,000 AADT screening criteria. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the proposed development satisfy the screening criteria (see Section 11.1.4.2) and a quantitative assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts to local air quality.

Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013.* Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 11.2). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. During the operational phase, if any of the road links impacted by the proposed development meet the below criteria then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

None of the road links impacted by the proposed development satisfy the above criteria and a quantitative assessment of the impact of traffic emissions on climate is not necessary as there is no potential for significant impacts to climate.

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. In addition to the EU guidance, the Institute of Environmental Management and Assessment (IEMA) guidance note on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (IEMA, 2022) states that "*the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*. Mitigation has taken a leading role within the guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

The Building Lifecycle Report prepared in relation to this development has been reviewed and used to inform the operational phase climate assessment. This report outlines a number of measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. In addition, a number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible, in line with the objectives of the IEMA guidance (2022).

11.1.5 Difficulties Encountered in Compiling Information

There were no difficulties encountered in compiling this assessment.

11.2 Description of Existing Environment

11.2.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Shannon Airport meteorological station, which is located approximately 16 km south of the site. Shannon Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 11.1). For data collated during five representative years (2016 – 2020), the predominant wind direction is westerly to easterly with generally moderate wind speeds (Met Eireann, 2022).

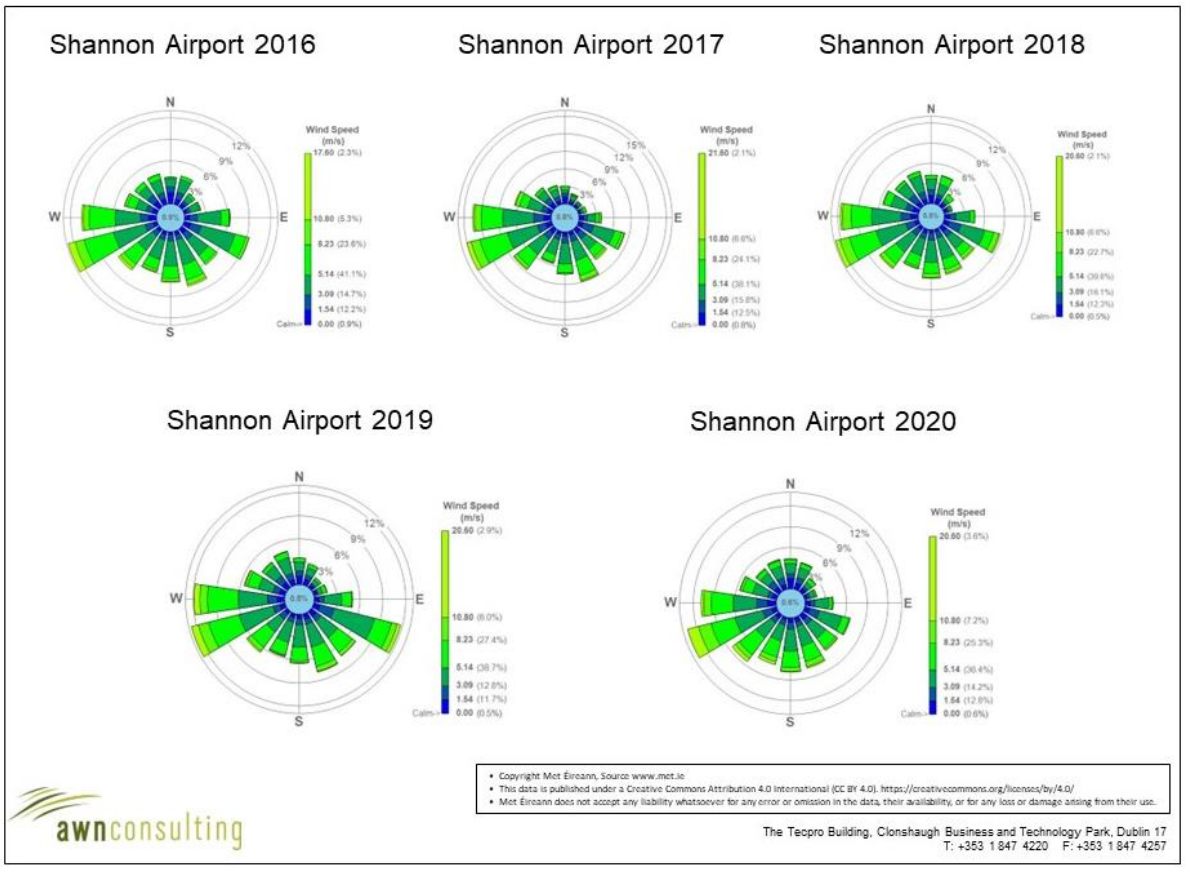

Figure 11.1: Shannon Airport Windroses 2016 – 2020 (Source: Met Eireann, 2022)

11.2.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2020*" (EPA, 2021a). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2022).

As part of the implementation of the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2022). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone C (EPA, 2022). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

In 2020 the EPA reported (EPA, 2021a) that Ireland was compliant with EU legal air quality limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA *Air Quality in Ireland 2020* report details the effect that the Covid-19 restrictions had on air monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term

trends. For this reason, they have not been included in the baseline section and previous long-term data has been used to determine baseline levels of pollutants in the vicinity of the proposed development.

Long-term NO_2 monitoring was carried out at three Zone C locations for the period 2015 – 2019, Kilkenny, Portlaoise and Dundalk (EPA, 2021a). Annual mean concentrations of NO_2 range from 5 – 14 µg/m^3 over the five-year period (Table 11.2). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3. Based on the above information, a conservative estimate of the current background NO_2 concentration in the region of the proposed development is 11 µg/m^3.

Table 11.2: Trends in Zone C Air Quality – Nitrogen Dioxide (NO_2)

Station	Averaging Period Note 1	Year				
		2015	2016	2017	2018	2019
Kilkenny	Annual Mean NO_2 (µg/m^3)	5	7	5	6	5
	Max 1-hr NO_2 (µg/m^3)	70	51	58	71	59
Portlaoise	Annual Mean NO_2 (µg/m^3)	10	11	11	11	11
	Max 1-hr NO_2 (µg/m^3)	84	86	80	119	77
Dundalk	Annual Mean NO_2 (µg/m^3)	-	-	-	14	12
	Max 1-hr NO_2 (µg/m^3)	-	-	-	91	144

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011). 1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Continuous PM_{10} monitoring was carried out at four Zone C locations from 2015 – 2019, Galway, Portlaoise, Ennis and Dundalk. Concentrations range from 10 – 18 µg/m^3 over the five year period (see Table 11.3). Hence, long term concentrations are significantly below the annual limit value of 40 µg/m^3. In addition, there were at most 12 exceedances (in Ennis) of the 24-hour limit value of 50 µg/m^3 in 2019, albeit 35 exceedances are permitted per year (EPA, 2021a). Monitoring in Ennis town, approximately 1.5km from the proposed development site, over the period 2015 – 2019 indicated that concentrations ranged from 16 – 18 µg/m^3. Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the development is 18 µg/m^3.

Table 11.3: Trends in Zone C Air Quality – PM_{10}

Station	Averaging Period Note 1	Year				
		2015	2016	2017	2018	2019
Galway	Annual Mean PM_{10} (µg/m^3)	15	15	-	15	13
	24-hr Mean > 50 µg/m^3 (days)	2	3	-	0	0
Ennis	Annual Mean PM_{10} (µg/m^3)	18	17	16	16	18
	24-hr Mean > 50 µg/m^3 (days)	10	12	9	4	12
Portlaoise	Annual Mean PM_{10} (µg/m^3)	12	12	10	11	15
	24-hr Mean > 50 µg/m^3 (days)	1	1	0	1	0
Dundalk	Annual Mean PM_{10} (µg/m^3)	-	-	-	15	14
	24-hr Mean > 50 µg/m^3 (days)	-	-	-	0	2

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011). Daily limit value - 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Average $PM_{2.5}$ levels in Ennis over the period 2015 – 2019 ranged from 10 – 14 µg/m^3, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.63 – 0.78 (EPA, 2021a). Based on this information, a conservative

ratio of 0.8 was used to generate an existing $PM_{2.5}$ concentration in the region of the proposed development of 12.8 µg/m^3.

Based on the above information the air quality in Zone C locations, such as the Ennis area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2021a).

11.2.3 Climate Baseline

Anthropogenic emissions of greenhouse gases (GHGs) in Ireland included in the European Union's Effort Sharing Regulation (ESR) (EU 2018/842) are outlined in the most recent review by the EPA which details provisional emissions up to 2021 (EPA, 2022b). The greenhouse gas emission inventory for 2021 is the first of ten years over which compliance with targets set in the ESR will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading Scheme (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce ESR emissions by 30% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. Ireland's ESR emissions annual limit for 2021 is 43.48 Mt CO_2eq[1]. Ireland's provisional 2021 GHG ESR emissions are 46.19 Mt CO_2eq, this is 2.71 Mt CO_2eq more than the annual limit for 2021 (EPA, 2022b). Agriculture continues to be the largest contributor to overall emissions at 37.5% of the total. Transport, energy industries and the residential sector are the next largest contributors, at 17.7%, 16.7% and 11.4%, respectively. GHG emissions for 2021 are estimated to be 4.7% higher than emissions in 2020, this is due to a gradual lifting of covid restrictions and an increase in the use of coal and less renewables within electricity generation. Ireland's GHG emissions have increased by 11.4% from 1990 – 2021.

Provisional National total emissions (including LULUCF) for 2021 are 69.29 Mt CO_2eq, these have used 23.5% of the 295 Mt CO_2eq Carbon Budget for the five-year period 2021-2025. This leaves 76.5% of the budget available for the succeeding four years, requiring an 8.4% average annual emissions reduction from 2022-2025 to stay within budget.

The EPA 2022 GHG Emissions Projections Report for 2021 – 2040 (EPA, 2022c) provides an assessment of Ireland's total projected greenhouse gas (GHG) emissions from 2021 to 2040, using the latest Inventory data for 2020 and provides an assessment of Ireland's progress towards achieving its National ambitions under the Climate Action and Low Carbon Development (Amendment) Act 2021 (Government of Ireland, 2021) and EU emission reduction targets for 2030 as set out under the EU Effort Sharing Regulation (ESR) 2018/842. Two scenarios are assessed – a "*With Existing Measures*" (WEM) scenario, which is a projection of future emissions based on the measures currently implemented and actions committed to by Government, and a "*With Additional Measures*" (WAM) scenario, which is the projection of future emissions based on the measures outlined in the latest Government plans at the time Projections are compiled. This includes all policies and measures included in the WEM scenario, plus those included in government plans but not yet implemented.

The EPA report states under the "*With Existing Measures"* scenario, the projections indicate that Ireland will cumulatively exceed its ESR emissions allocation by 52.3 Mt CO_2eq over the 2021-2030 period even with full use of the flexibilities available. Under the "*With Additional Measures scenario"*, the projections indicate that Ireland can achieve compliance under the ESR over the 2021-2030 period

[1] Mt CO_2eq – million tonnes carbon dioxide equivalent

using both flexibilities but only with full implementation of the 2021 Climate Action Plan. Both projected scenarios indicate that implementation of all climate plans and policies, plus further new measures, are needed for Ireland to meet the 51 per cent emissions reduction target and put the country on track for climate neutrality by 2050 (EPA, 2022c).

11.2.4 Sensitivity of the Receiving Environment

In line with the IAQM guidance document (2014) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time, schools and hospitals. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

The surrounding land-use in the vicinity of the proposed development is predominantly agricultural to the west of the proposed development site. The Ennis golf Club bounds the site to the north-east. There are high sensitivity residential properties bordering the site to the east and south along Circular Road (see Figure 11.2). There are approximately 16 no. high sensitivity residential properties within 20m of the proposed development site boundary. Based on the IAQM criteria outlined in Table 11.4, the worst case sensitivity of the area to dust soiling is considered high.

Table 11.4: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	**High**	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Source: IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type and the number of receptors affected within various distance bands from the proposed demolition and construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 18 $\mu g/m^3$ and there are approximately 16 no. high sensitivity receptors located within 20 m of the site boundary (see Figure 11.2). Based on the IAQM criteria outlined in Table 11.5, the worst case sensitivity of the area to human health impacts is considered low.

Table 11.5: Sensitivity of the Area to Dust Related Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	**Low**	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

Source: IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

The IAQM guidance also outlines the criteria for determining the sensitivity of an ecological receptor to dust impacts. The sensitivity is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present (see Table 11.6). The Cahircalla Wood pNHA (site Code 001001) is located c. 760m to the south of the site and the Lower River Shannon SAC (site code 002165) is located c. 920m to the north-east of the site. The IAQM guidance states that dust impacts to sensitive ecology can occur within 50m of the site. As the closest sensitive ecological area is over 700m from the site boundary there is no potential for significant dust soiling effects at this distance and further assessment is not required.

Figure 11.2: Sensitive Receptors within 20m of Site

11.3 Predicted Impacts

11.3.1 Do Nothing Scenario

Under the Do Nothing Scenario no construction works will take place and the identified impacts of construction dust emissions and engine exhaust emissions will not occur. The air quality in the vicinity of the site will continue to follow recent trends in future years. The Do Nothing Scenario is considered neutral in terms of air quality and climate.

11.3.2 Construction Phase

11.3.2.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Shannon Airport meteorological data (see Section 11.2.1) indicates that the prevailing wind direction is westerly to south-easterly and wind speeds are generally moderate in nature. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Shannon Airport indicates that on average 211 days per year have rainfall over 0.2 mm (Met Eireann, 2022) and therefore it can be determined that over 57% of the time dust generation will be reduced.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 10.3.4). As per Section 11.4.2.1 the major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

There is no demolition proposed as part of the proposed development.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The total site area is 11.3 ha which is greater than 10,000 m^2. There will be in the region of 40,000 m^3 (approximately 34,000 tonnes) of soil required for excavation and infill works, which is less than 100,000 tonnes. The dust emission magnitude for the proposed earthwork activities can be classified

as large as a conservative approach due to the overall site area. Combining the sensitivity of the area as established in Section 11.2.4 with the dust emission magnitude in Table 11.6 results in an overall high risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed earthworks activities.

Table 11.6: Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Source: IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small:** Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as large as the total building volume to be constructed will be greater than 100,000 m^3. As outlined in Table 11.7, this results in an overall high risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed construction activities.

Table 11.7: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Source: IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;

- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as medium, as there will be in the region of 12 outward HGV movements per day. As outlined in Table 11.8, this results in an overall medium risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed trackout activities.

Table 11.8: Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Source: IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in Table 11.9 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, a range of dust mitigation measures associated with a high risk of dust impacts will be implemented. In the absence of mitigation dust soiling impacts from construction works are predicted to be short-term, localised, negative and slight.

Table 11.9: Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Emission Magnitude	N/A	Large	Large	Medium
Dust Soiling Risk	N/A	High Risk	High Risk	Medium Risk
Human Health Risk	N/A	Low Risk	Low Risk	Low Risk

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the DMRB assessment criteria in Section 11.1.4.2. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral, and short-term impact on air quality.

11.3.2.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a

significant impact on climate. Therefore, the potential impact on climate is considered to be imperceptible, neutral and short-term.

11.3.2.3 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 11.5 the surrounding area is of low sensitivity to dust related human health impacts. In addition, it has been determined that there is at most a low risk of human health impacts from construction dust emissions (Table 11.9). In the absence of mitigation there is the potential for short-term, negative and imperceptible impacts to human health as a result of construction dust emissions.

11.3.3 Operational Phase

11.3.3.1 Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, PM_{10} and $PM_{2.5}$. However, impacts from these emissions have been screened out using the UK DMRB guidance (UK Highways Agency, 2019), on which the TII guidance (2011) was based. None of the road links impacted by the proposed development satisfy the screening criteria (see Section 11.1.4.2) and an assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts. It can therefore be determined that the impact to air quality from traffic emissions during the operational stage is neutral, localised, long-term and imperceptible.

11.3.3.2 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be long-term, localised, neutral and imperceptible.

There is also the potential for increased traffic volumes to impact climate. The change in AADT values is not of the magnitude to require a detailed climate assessment as per the DMRB screening criteria outlined in Section 11.1.4.3 (UK Highways Agency, 2019b). It can therefore be determined that traffic related CO_2 emissions during the operational phase are long-term, localised, neutral and imperceptible.

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Building lifecycle Report prepared by Deady Gahan Architects and are summarised below.

The development will be a Nearly Zero Energy Building (NZEB) in accordance with the Part L 2021 requirements as appropriate. Each building will have a Building Energy Rating (BER) that will comply with the Part L requirements. Use of natural daylight will be maximised where possible in addition to natural ventilation to reduce the requirement for artificial lighting and mechanical ventilation. Windows will be dual or triple glazed to reduce heating costs. Building materials with a high durability and low future maintenance requirement will be chosen where possible to reduce the need for replacement and significant maintenance in the future which will in turn reduce the embodied carbon of the development during operation. Both high-performance U-values and improved air tightness of the buildings will be considered at the detailed design stage to reduce energy consumption. Air to water heat pumps are being considered as the renewable energy source as they reduce fossil fuel consumption and carbon emissions. Energy efficient LED lighting will be used within the development

and electric vehicle (EV) car charging points will be incorporated into the development to provide occupants with a more sustainable choice of transport. Overall these measures will aid in reducing the impact to climate during the operational phase of the proposed development.

11.3.3.3 Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, the traffic generated by the proposed development does not satisfy the assessment criteria to require an air modelling assessment as outlined in Section 11.1.4.2 and therefore there is no potential for significant impacts. It can be determined that the impact to human health during the operational stage is neutral, local, non-significant, long-term and imperceptible.

11.3.4 Cumulative

11.3.4.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other development within 350m then there is the potential for cumulative construction dust impacts. There are no developments within 350m of the site that would have coinciding construction phases and therefore there is no potential for cumulative dust related impacts. In addition, a high level of dust control will be implemented across the site which will avoid significant dust emissions. Due to the short-term duration of the construction phase and the low potential for significant CO_2 emissions cumulative impacts to climate are considered neutral.

There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

11.3.4.2 Operational Phase

The traffic data reviewed for the operational stage impacts to air quality and climate included the cumulative traffic associated with other existing and permitted developments in the local area. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, neutral, and imperceptible with regards to air quality and climate.

There are no significant cumulative impacts to air quality or climate predicted for the operational phase.

11.4 Mitigation Measures

11.4.1 Construction Phase Mitigation

11.4.1.1 Air Quality

The proactive control of fugitive dust will ensure the prevention of significant emissions. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 11.2 of this EIAR. These measures shall be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared in respect of the proposed development.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

11.4.1.2 Climate

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures can be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

11.4.2 Operational Phase Mitigation

The impact of the operational traffic associated with proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required other than those set out in Section 11.3.3.2 in relation to operational phase energy usage.

11.4.3 Monitoring

11.4.3.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period of 30 days (+/- 2 days).

11.4.3.2 Operational Phase

There is no monitoring recommended for the operational phase as it is predicted to have a non-significant, imperceptible impact on air quality and climate.

11.5 Residual Impacts

11.5.1 Construction Phase

11.5.1.1 Air Quality

Once the dust minimisation measures outlined in Section 11.4.1 and Appendix 11.2 are implemented, the impact of the proposed development in terms of dust soiling will be short-term, negative, localised and imperceptible at nearby receptors.

11.5.1.2 Climate

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate. Therefore, the predicted impact is short-term, neutral and imperceptible.

11.5.1.3 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development will be negative, short-term and imperceptible with respect to human health.

11.5.2 Operational Phase

11.5.2.1 Air Quality

None of the road links impacted by the proposed development satisfied the assessment criteria outlined in Section 11.1.4.2 for carrying out a detailed air modelling assessment. Therefore, there is no potential for significant impacts to air quality as a result of traffic related to the proposed development. It can therefore be determined that the impact to air quality as a result of increased traffic volumes during the operational phase of the proposed development is localised, neutral, non-significant, imperceptible and long-term.

11.5.2.2 Climate

None of the road links impacted by the proposed development satisfied the assessment criteria outlined in Section 11.1.4.3 for carrying out a detailed air modelling assessment of CO_2 emissions from traffic. Therefore, there is no potential for significant impacts to climate as a result of traffic related to the proposed development. It can therefore be determined that the impact to climate as a result of increased traffic volumes during the operational phase of the proposed development is neutral, imperceptible and long-term. In addition, the proposed development has been designed to reduce the impact to climate where possible during operation.

11.5.2.3 Human Health

Emissions of air pollutants are predicted to be significantly below the ambient air quality standards which are based on the protection of human health. Therefore, impacts to human health are long-term, neutral, non-significant and imperceptible.

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Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

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CHAPTER 12

Cultural Heritage and Archaeology

August 2022

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12.1 Introduction

This chapter assesses the impacts of the proposed development as described in Chapter 2 on the known and potential cultural heritage resource concerning the integrity, continuity and context of same for future generations. Cultural Heritage encompasses several aspects of tangible assets (immovable: archaeological sites and monuments, architectural heritage structures; movable: artefacts; and underwater: shipwrecks, submerged features) and intangible assets (e.g., folklore, oral tradition and language).

12.1.1 Author Information and Competency

The assessment was carried out by Tony Cummins and Alan McCombs of John Cronin and Associates. Mr. Cummins holds primary and post-graduate degrees in archaeology (B.A. 1992 and M.A. 1994, University College Cork) and Mr. McCombs has a Bachelor of Science in Applied Archaeology (Institute of Technology, Sligo 2015). Both individuals have extensive experience in the preparation of cultural heritage impact assessments, including the compilation of desktop research and undertaking field surveys of proposed development locations.

12.1.2 Reference to Guidelines Relevant to Discipline

The guidelines relevant to the assessment include the *Architectural Heritage Protection: Guidelines for Planning Authorities* (Department of Arts, Heritage and Gaeltacht 2011) and the *Framework and Principles for the Protection of Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht and the Islands 1999). The assessment was also informed by the Environmental Protection Agency (EPA 2022) *Guidelines for Information to be Contained in EIAR* and the International Council on Monuments and Sites (ICOMOS 2011) *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*.

12.1.3 Methodology

The assessment was based on a programme of desktop research combined with a field survey of the proposed development lands which were carried out in order to identify any features of archaeological, architectural, or cultural heritage significance likely to be impacted by the proposed development. The recorded and potential cultural heritage resource within a study area encompassing the lands comprising the proposed housing development location and surrounding lands extending for 1km in all directions, was assessed in order to compile a comprehensive cultural heritage context for the area.

The following presents an overview of the assessment studies and the methodology applied to determine the nature and significance of potential impacts on the cultural heritage resource.

12.1.3.1 Desktop Research

Documentary research on the recorded and potential cultural heritage resource within the study area was carried out in order to identify any recorded archaeological, architectural and other cultural heritage sites and features. This information has provided an insight into the development of the study area over time and also assisted in an evaluation of the potential presence of hitherto unrecorded cultural heritage sites or features within the proposed development site.

The principal sources reviewed for the assessment of the recorded archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage. The current Record of Protected Structures (RPS) and structures listed in the National Inventory of Architectural Heritage (NIAH) were reviewed in order to assess the designated architectural heritage resource within the study area.

Other sources consulted as part of the assessment included the following:

- Development Plan: The current Clare County Development Plan 2017-2023 was consulted as part of this assessment. This publication identifies the buildings listed in the Record of Protected Structures and outlines the Council's policies for the protection of the archaeological and architectural heritage resource.
- Database of Irish Excavation Reports: The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland (North and South) from 1970 to present. Current data was accessed via www.excavations.ie in June 2022.
- Literary Sources: Various published literary sources were consulted in order to assess the archaeological, historical, architectural heritage and folklore record of the study area and these are listed in Section 12.6 of this chapter.
- Archaeological Survey of Ireland: While there is no published archaeological inventory for County Clare, the National Monuments Service's online Historical Environment Viewer (www.archaeology,ie) presents inventory descriptions compiled by the Archaeological Survey of Ireland for a range of known archaeological sites within the county. All available inventory entries for sites located within the study area are included within Section 12.2.3.1 of this chapter.
- Historic Maps: The detail on historic maps sources can indicate the presence of past settlement patterns, including features of archaeological and architectural heritage significance that no longer have any surface expression. Available cartographic sources dating from the 17th century onward were reviewed and relevant extracts are presented in Section 12.2.3.3 of this chapter.
- Aerial/Satellite Imagery: A review of available online aerial images of the study area was undertaken in order to ascertain if any traces of unrecorded archaeological sites were visible and to review the extent of development within the study area during recent decades.
- LiDAR Imagery: The proposed development is within the coverage area of Transport Infrastructure Ireland (TII) LiDAR data which has been collated and published online by Geological Survey Ireland. This form of imagery has the potential to reveal the presence of archaeological sites with low surface expressions and was reviewed as part of the assessment.
- Irish Heritage Council: Heritage Map Viewer: This online mapping source (www.heritagemaps.ie) is a spatial data viewer which collates various cultural heritage datasets sourced from, among others, the National Monuments Service, National Museum of Ireland, local authorities, the Royal Academy of Ireland and the Office of Public Works.
- National Museum of Ireland Topographical Files: These files comprise a written and digital database which records known information in relation to the discovery locations of Irish archaeological artefacts, including those held in the museum's collection. The files are archived in the museum's premises in Kildare Street, Dublin and were inspected as part of the desktop study. The archive contains no files recording the discovery of artefacts within the townlands extending into the proposed development site.
- Irish National Folklore Collection: Transcribed material from the National Folklore Collection archive has been digitised and published online at www.duchas.ie.
- Placenames Database of Ireland: This online database (www.logainm.ie) provides a comprehensive management system for data, archival records and place names research conducted by the State.
- UNESCO designated World Heritage Sites and Tentative List: There are two world heritage sites in Ireland and a number of other significant sites are included in a Tentative List (2010) that has been put forward by Ireland for inclusion.

12.1.3.2 Site Inspection

A field-walking survey of all areas of the proposed development site was carried out to assess the lands in terms of modern land use, vegetation cover and the potential for the presence of previously unrecorded archaeological sites or structures of architectural heritage interest. The field survey results are described within Section 12.2.4 of this chapter and extracts from the photographic record are presented in **Appendix 12.1**.

12.1.3.3 Consultations

A response to a scoping request was issued by the Development Applications Unit of the Department of Housing, Local Government and Heritage (dated 22 April 2022) and contained no recommendations or observations in relation to the archaeological, architectural or cultural heritage resources.

12.1.3.4 Impact Assessment

The methodology used for the assessment of potential impacts has been informed by the Environmental Protection Agency (EPA) Guidelines for Information to be Contained in EIAR (2022), in accordance EIA requirements of codified EU Directive 2011/92/EU as amended by EU Directive 2014/52/EU, per current Planning Legislation, concerning EIA assessment: Planning and Development Act, 2000 (as amended) (Part X) and in Part 10 of the Planning and Development Regulations, 2001 (as amended).

The following summation of the criteria used to assess impacts is provided in order to concisely outline the methodology specifically applied to the cultural heritage resource. Assessment is achieved by a consideration of the duration, quality, type, value and magnitude of effect(s) on the cultural heritage resource:

Duration of Effect is assessed based on the following criteria:

- Momentary (seconds to 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
- Reversible: Effects that can be undone, for example through remediation or restoration

Quality of Effect on the cultural heritage resource can be positive, neutral or negative.

- Positive: a change which improves the quality of the cultural heritage environment (e.g. increasing amenity value of a site in terms of managed access, signage, presentation etc. or high-quality conservation and re-use of an otherwise vulnerable derelict structure).
- Neutral: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment.
- Negative: a change which reduces the quality of the cultural heritage resource (e.g. visual intrusion on the setting of an asset, physical intrusion on features/setting of a site)

Type of Effect on the cultural heritage resource can be direct, indirect or no predicted impact.

- Direct impact: where a cultural heritage site is physically located within the footprint of the proposed development, which will result in its complete or partial removal.
- Indirect impact: where a cultural heritage site or its setting is located in close proximity to the footprint of the proposed development.
- No predicted impact: where the proposed development will not adversely or positively affect a cultural heritage site.

Magnitude of Effect is based on the degree of change, incorporating any mitigation measures, and is based on a consideration of the character, duration, probability and consequences (Table 12.1). The magnitude can be negative or positive and is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible.

The descriptions of magnitudes presented in Table 12.1 is based on guidance published in Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS 2011, 16-7).

Table 12.1: Magnitudes of Effect on Cultural Heritage Assets

Magnitude	Description
High	Most or all key archaeological or architectural materials affected such that the resource is totally altered Comprehensive changes to setting Changes to most or all key historic landscape elements, parcels or components; extreme visual effects; fundamental changes to use or access; resulting in total change to historic landscape character Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation
Medium	Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified. Considerable changes to setting that affect the character of the archaeological asset. Changes to the setting of a historic building, such that it is significantly modified. Change to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, considerable changes to use or access, resulting in moderate changes to historic landscape character. Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Low	Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different. Slight changes to setting of an archaeological monument. Change to setting of a historic building, such that it is noticeably changed. Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; slight changes to use or access; resulting in limited change to historic landscape character Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Negligible	Very minor changes to key archaeological materials or setting. Slight changes to historic building elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes to use or access; Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

Value Assessment

While various national and local authority legal designations exist for elements of the Irish cultural heritage resource (see Section 1.3.2), there are currently no formal criteria for grading the values of individual elements of this resource. The National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Local, Regional and National) to structures included in that inventory and, while these rankings do not confer a graduated level of protection they have been utilised as a value indicator for NIAH-listed structures for the purpose of this assessment.

Given the absence of formal criteria the evaluations used in this assessment have been informed by guidelines presented in the Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS 2011). The evaluation of the values of cultural heritage assets is, therefore, not intended as definitive but rather as an indicator which contributes to a wider judgment based the individual circumstances of each asset. The application of values included a consideration of their legal designations (e.g., National Monuments), condition / preservation; historical significance, group value,

rarity, visibility in the landscape, fragility/vulnerability and amenity value on a case-by-case basis. It is noted that archaeological monuments, whether extant or levelled, have the potential to possess sub-surface attributes, such as artefacts, human burials or other archaeological remains, that may possess values that cannot be discerned without recourse to archaeological excavation but are unlikely to be affected in the absence of direct negative impacts. The value of all known or potential assets that may be impacted by development are ranked according to the following scale as defined by ICOMOS: Very High; High; Medium; Low, Negligible, Unknown (Table 12.2). The values assigned to relevant cultural heritage assets within the area were determined following the completion of the desktop research combined with subsequent site inspections and are outlined in Section 12.2.5.

Table 12.2: Indicative Factors for Assessing the Value of Cultural Heritage Assets

Value	Description
Very High	World Heritage Sites (including Tentative List properties) Sites, buildings or landscapes of acknowledged international importance Intangible associations with individuals or innovations of global significance
High	Nationally designated sites, buildings and landscapes of significant quality, rarity, preservation and importance Undesignated assets of the quality and importance to be designated Assets that can contribute significantly to acknowledged national research objectives Archaeological Landscapes with significant group value Intangible associations with individuals or innovations of national significance
Medium	Designated or undesignated assets that can contribute significantly to regional research objectives, including buildings that can be shown to have exceptional qualities in their fabric or historical associations Conservation Areas and historic townscapes containing buildings that contribute significantly to its historic character Intangible associations with individuals or innovations of regional significance
Low	Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value, but with potential to contribute to local research objectives Historic Townscape or built-up areas of limited historic integrity in their buildings and settings Intangible associations with individuals or innovations of local significance
Negligible	Assets with very little or no surviving archaeological interest Landscapes little or no significant historical interest Buildings or urban areas of no architectural or historical note; buildings of an intrusive character
Unknown Potential	Assets whose importance has not been ascertained Buildings with some hidden (i.e., inaccessible) potential for historic significance

Significance of Effects is assessed based on a consideration of the Magnitude of the Impact (graded from High to Negligible, based on a consideration of character, duration, probability and consequences) combined with the Value (graded from High to Negligible, based on a consideration of significance/sensitivity) of the cultural heritage asset. The Significance can be described as Profound, Very Significant, Significant, Moderate, Slight, Not Significant or Imperceptible (Table 12.3 and Table 12.4).

Table 12.3: Significance of Effects (per EPA EIAR Guidelines 2022)

Significance	Description
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences

Significance	Description
Slight	An effect which causes noticeable changes in the character of the environment but without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 12.4: Significance of Effects Matrix (after EPA EIAR Guidelines 2022)

Magnitude of Impact	**High**	Not Significant/ Slight	Moderate/ Significant	Significant/ Very Significant	Very Significant/ Profound
	Medium	Not Significant	Slight	Moderate/ Significant	Significant/ Very significant
	Low	Not Significant/ Imperceptible	Slight/ Not Significant	Slight	Moderate
	Negligible	Imperceptible	Not Significant/ Imperceptible	Not Significant/ Slight	Slight
		Negligible	**Low**	**Medium**	**High**
		Value/Sensitivity of the Asset			

12.1.4 Difficulties Encountered in Compiling Information

There were no difficulties encountered during the compilation of this assessment.

12.2 Description of Existing Environment

12.2.1 General Context

The proposed development site comprises an area of vacant green field lands in the townlands of Keely and Ballymacaula which are in the western outskirts of the modern suburbs of Ennis town at a distance of approximately 1.5km to the west of the historic town centre. The site is bound to the west by the N85 Ennis Bypass and to the east by Ennis Golf Club with modern suburban developments encroaching into the farmlands in surrounding lands.

12.2.2 Legal and Planning Context

This section presents a concise summary of the legal and planning policy frameworks relevant to this assessment in order to provide a context for the statutory protection assigned to the cultural heritage resource. The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the Granada Convention (1985) (formally the European Convention on the Protection of Architectural Heritage), ratified by Ireland in 1997; and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified by Ireland in 2015. The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed and none are located within the environs of the study area.

The National Monuments Service (NMS), which is currently based in the Department of Housing, Local Government and Heritage, is responsible for the protection and promotion of Ireland's archaeological heritage.

The national legal statutes and guidelines relevant to this assessment include:

- National Monuments Acts 1930 (as amended)
- Heritage Act 1995 (as amended)
- National Cultural Institutions Act 1997

The Architectural Heritage (National Inventory) and Historic Monuments (Misc) Provisions Act 1999

- Planning and Development Act 2000, as amended
- Department of Arts, Heritage and Gaeltacht 2011 *Architectural Heritage Protection: Guidelines for Planning Authorities.*
- Department of Arts, Heritage, Gaeltacht and the Islands 1999 *Framework and Principles for the Protection of Archaeological Heritage*

12.2.2.1 Archaeological Legislation and Planning Policies

The National Monuments Act 1930 and its Amendments, the Heritage Act 1995 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains. There are a number of mechanisms under the National Monuments Acts that are applied to secure the protection of archaeological monuments. These include the designation of National Monument status for sites of national significance, the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP), the Sites and Monuments Record (SMR), and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites[1].

Section 2 of the National Monuments Act, 1930 defines a National Monument as 'a monument or the remains of a monument, the preservation of which is a matter of national importance'. The State may acquire or assume guardianship of examples through agreement with landowners or under compulsory orders. Archaeological sites within the ownership of local authorities are also deemed to be National Monuments. The prior written consent of the Minister is required for any works at, or in proximity to, a National Monument or at sites which are subject to a Preservation Order. There are no National Monuments in State Care or sites assigned Preservation Orders located within the study area.

The RMP was established under Section 12(1) of the National Monuments (Amendment) Act, 1994 and was based on the earlier SMR and RHM. It comprises lists and maps of all known archaeological monuments and places for each county in the State and all listed archaeological sites receive statutory protection under the National Monuments Act 1994. No works can be undertaken at their locations or within their surrounding designated Zones of Notification without providing two months advance notice to the NMS. There are no recorded archaeological sites located within the proposed development site while there are ten examples in the surrounding 1km study area (Table 12.5). None of these sites are National Monuments in State Care or are included in the current list of monuments that have been assigned Preservation Orders.

The Clare County Development Plan 2017-2023 includes the following policies and objectives in relation to the protection of the archaeological resource within the county:

> *CDP15.8: Sites, Features and Objects of Archaeological Interest*
>
> *a) To safeguard sites, features and objects of archaeological interest generally;*

[1] https://www.archaeology.ie/sites/default/files/media/publications/NMS%20-%20Managing%20and%20Protecting%20Ireland%27s%20Archaeological%20Heritage%202013.pdf

b) To secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments included in the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, and of sites, features and objects of archaeological and historical interest generally (in securing such preservation, the Council will have regard to the advice and recommendations of the Department of the Arts, Heritage, Regional, Rural and Gaeltacht Affairs);

c) To permit development only where the Planning Authority is satisfied that the proposals will not interfere with: items of archaeological or historical importance; the areas in the vicinity of archaeological sites; the appreciation or the study of such items.

d) To have regard to the government publication 'Framework and Principles for the Protection of the Archaeological Heritage 1999' in relation to protecting sites, features and objects of archaeological interest;

e) To advocate for greater financial assistance for the maintenance and improvement of features of archaeological interests in County Clare.

CDP15.9 Development Plan Objective: Newly Discovered Archaeological Sites: It is an objective of the Development Plan: To protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places.

12.2.2.2 Architectural Heritage Legislation and Planning Policies

Protection of architectural or built heritage is provided for through a range of legal instruments that include the Heritage Act 1995, the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act 1999, and the Planning and Development Act 2000. The Planning and Development Act 2000 requires all Planning Authorities to keep a 'Record of Protected Structures' (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. As of the 1st January 2000, all structures listed for protection in current Development Plans, have become 'protected structures'. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. A protected structure also includes the land and other structures within its curtilage. While the term 'curtilage' is not defined by legislation, the *Architectural Heritage Protection Guidelines for Local Authorities* (Department of Arts, Heritage and the Gaeltacht 2011), describes it as the parcel of land immediately associated with a structure and which is (or was) in use for the purposes of the structure. In addition, local authorities must provide for the preservation of places, groups of structures and townscapes of architectural heritage significance through designation of Architectural Conservation Areas (ACAs).

The National Inventory of Architectural Heritage (NIAH) was established to record architectural heritage structures within the State and while inclusion in the NIAH does not provide statutory protection listing in the inventory is a signifier of architectural heritage value and it is intended to advise local authorities on compilation of their Record of Protected Structures. The NIAH also includes a Survey of Historic Gardens and Landscapes which comprises a non-statutory, desk-based survey of such features.

Details on the Protected Structures and NIAH-listed features within the study area are provided in **Section 12.2.3.5** of this chapter.

The Clare County Development Plan 2017-2023 presents a number of objectives to ensure the protection of the architectural heritage resource within the County and these include:

CDP15.1 Development Plan Objective: Architectural Heritage

a) To ensure the protection of the architectural heritage of County Clare through the identification of Protected Structures, the designation of Architectural Conservation Areas, the safeguarding of historic gardens, and the recognition of structures and

elements that contribute positively to the vernacular and industrial heritage of the County;

b) To ensure that the architectural heritage of the County is not damaged either through direct destruction or by unsympathetic developments nearby.

CDP15.2 Development Plan Objective: Protected Structures

a) To protect, as set out in the Record of Protected Structures, all structures and their settings, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest;

b) To review the Record of Protected Structures periodically and add structures of special interest as appropriate, including significant elements of industrial, maritime or vernacular heritage and any twentieth century structures of merit.

12.2.3 Desktop Study

Relevant datasets have been interrogated and retrieved from current state and local authority sources and are considered accurate at the time of writing in July 2022. The dating framework used for each period of the archaeological record is based on the framework presented in the *Guidelines for Authors of Reports on Archaeological Excavations* as published by the National Monuments Service (2006). The published inventory entries of all recorded archaeological sites within the study area are presented. Information acquired from other sources consulted during the desktop study is also presented, including historic maps, literary sources, and online aerial, satellite and LiDAR imagery.

There are no recorded archaeological sites located within the proposed development site while there are ten recorded examples located within the surrounding 1km study area (Table 12.5 and Figure 12.1). One of these (CL033-170----) is located in close proximity to the west boundary of the proposed development site but this comprised a 19th-century limekiln which was excavated in 2004 in advance of the construction of the N85 road and no longer remains at this location.

A review of the current SMR, as published on the National Monument Service's online Historic Environment Viewer, revealed that it contains no records for the presence of any unlocated archaeological sites within the two townlands that extend into the proposed development site (Keelty and Ballymacaula).

Table 12.5: Recorded Archaeological Sites within the Study Area

Monument No.	Class	Townland	ITM E	ITM N	Distance from development
CL033-074----	House - 18th/19th century	KILNACALLY	531200	677289	c. 1,000m to west
CL033-075----	Cashel	KILNACALLY	531266	676823	c. 750m to west
CL033-078----	Enclosure	SHANVOGH	531588	677306	c. 600m to west
CL033-081----	House - 18th/19th century	CLOGHLEAGH	532630	677558	c. 440m to northeast
CL033-114001-	Cashel	BALLYMACAULA	531516	676532	c. 600m to west
CL033-114002-	House - indeterminate date	BALLYMACAULA	531516	676532	c. 600m to west
CL033-163003-	Field system	CAHIRCALLA MORE	532434	675620	1,000m to south
CL033-169----	Ring-ditch	CLAUREEN	532495	678091	c. 800m to north
CL033-170----	Kiln - lime	KEELTY	532157	677216	c. 25m to west
CL033-171----	Ringfort	CAHIRCALLA MORE	532261	676410	c, 215m to southeast

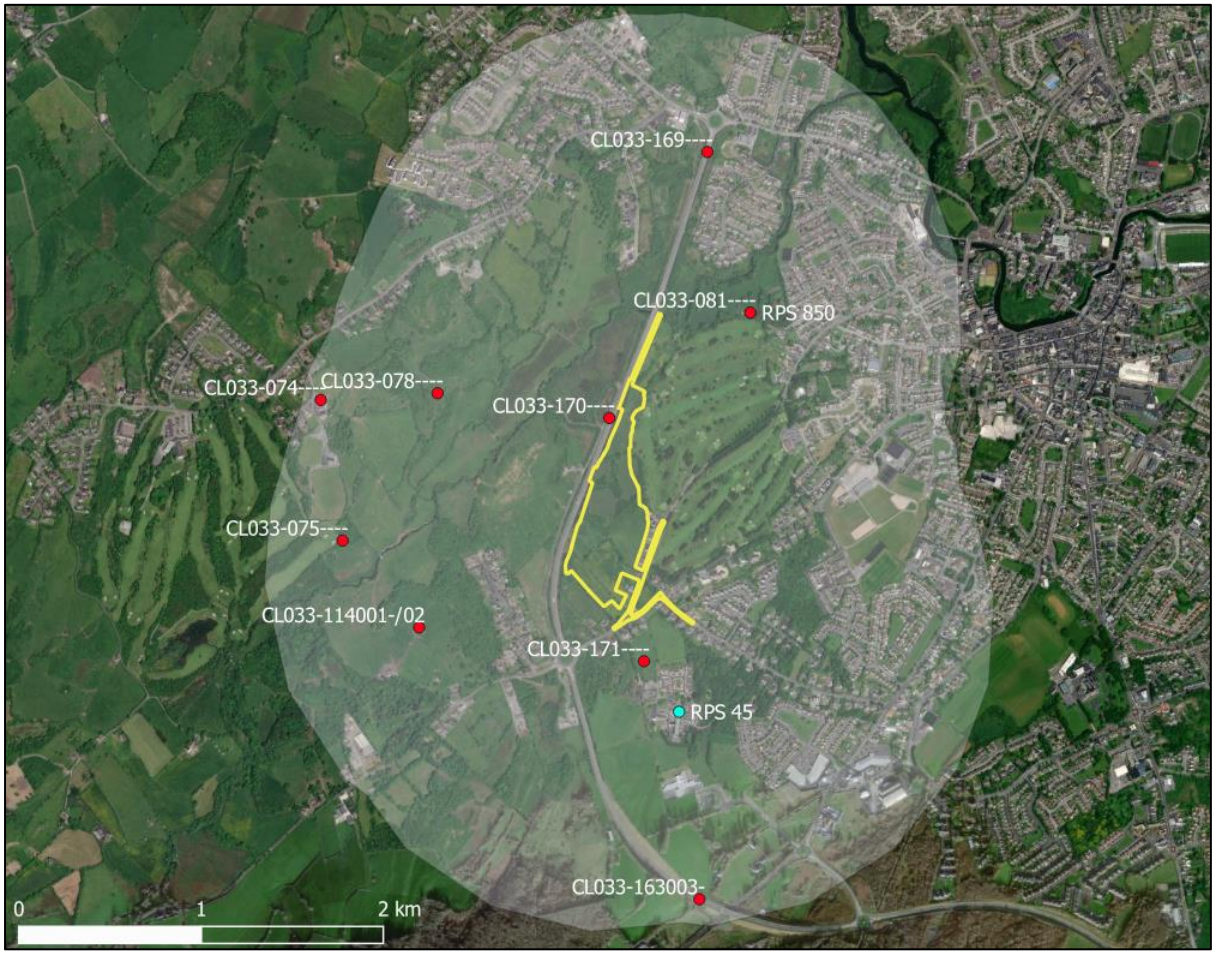

Figure 12.1: Recorded archaeological sites and Protected Structures within 1km study area

12.2.3.1 Archaeological Heritage

Early Prehistoric Periods

Until the recent identification of Palaeolithic human butchery marks on animal bones recovered from cave sites which have been dated to the Palaeolithic period, including an example from the Alice and Gwendoline Cave located c.3.5km southwest of Ennis, the earliest recorded evidence for human activity in Ireland dated to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers lived on the heavily wooded island. The archaeological record indicates that these mobile groups favoured coastal, lake and river shores which provided a transport and food resource. They did not construct any settlements or monuments that have left any above ground traces although their presence in an area can often be identified by scatters of worked flints in ploughed fields or during earthmoving undertaken as part of development works. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns in farmlands within areas of cleared forestry. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, and artefacts such as pottery begin to appear in the archaeological record during this period. There are no identified Mesolithic or Neolithic sites located within the 1km study area.

Late Prehistoric Periods

The advent of the Bronze Age period (c. 2400–500 BC) in Ireland saw the introduction of a new artefactual assemblage, including metal and ceramic objects, to the island. This period was also associated with the construction of new monument types such as wedge tombs, standing stones, stone rows/circles and burnt mounds known as fulachta fia. The development of new burial practices

during this period also saw the construction of funerary monuments such as cairns, barrows, boulder burials and cists. The arrival of iron-working technology in Ireland saw the advent of the Iron Age (600 BC – 400 AD). Relatively little has been known about Iron Age settlement and ritual practices until recent decades when the corpus of evidence has been greatly increased by the discovery of sites dating to this period during bog-cutting works and road construction projects. It is noted that while the vast majority of prehistoric settlement sites leave no above ground remains their foundations and occupation deposits, which may contain artefactual and environmental remains, can often survive below modern ground surfaces. There is one site of probable late prehistory date within the 1km study area, and this comprises a fulacht fiadh (CO075-011----) which is a site type typically interpreted as the remains of Bronze Age cooking activities. While many have been levelled by ploughing or land improvement works, in their undisturbed form they comprise horseshoe-shaped mounds of heat-cracked stone and charcoal-enriched soil often built up around a central trough. They functioned by placing heated stones into a water-filled trough in order to raise the water to boiling point and are typically located near or adjacent to streams, springs or marshy areas. There is no published archaeological inventory entry for this site.

A ring-ditch site (CL033-169----) in the north end of the study area was identified and excavated during archaeological investigations in advance of the construction of the N18 Ennis bypass. These sites comprise small circular or near circular enclosures, usually less than 20m in diameter, which may date to any period from prehistory onward. While the ASI have not published an inventory entry for this site a review of the Database of Irish Excavation Reports revealed that it comprised a 6m diameter enclosure containing cremated bone and glass beads indicating the site had a potential funerary function and perhaps dated to the Late Iron Age (**Appendix 12.2**; Licence 04E0026).

The Early Medieval Period

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to settlement sites of the period but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. While this period saw the emergence of the first phases of urbanisation around the Hiberno-Norse ports, the dominant settlement pattern continued to be rural-based and centred around enclosed earthwork farmsteads known as ringforts. These are the most common early medieval sites within the Irish landscape and comprise circular enclosures delimited by earthen banks formed of material thrown up from a concentric external ditch. Their stone-built equivalents, concentrated in western counties, are known as cashels and comprise enclosures constructed with drystone walling. The ubiquity of these enclosures within the Irish landscape is attested to by the fact that their original Gaelic names (rath, lios, dun, caiseal) still form the roots of some of the most common place-name elements in the country. Archaeological excavations have demonstrated that the majority comprised enclosed farmsteads containing the foundations of domestic and agricultural buildings. The enclosures may form the visible element of wider farmlands (known as airlise) that may contain unrecorded, sub-surface archaeological features such as associated field systems, stockades, barns, mills and drying kilns. The Archaeological Survey of Ireland also designates certain archaeological sites with no diagnostic features which would allow accurate classification as “enclosures”. While sites assigned this classification can theoretically date from any period from late prehistory onward, the potential exists that many may form the remains of ringforts.

There are two cashels (CL033-075---- & CL033-114001-), one ringfort (CL033-171---), one enclosure (CL033-078----) and a field system (CL033-163003-) of potential early medieval date located within the 1km study area and two of these have inventory entries published by the Archaeological Survey of Ireland:

CL033-075----
Class: Cashel
Townland: KILNACALLY
Description: Situated at the outer edge of a shelf on a SE-facing slope with the SW-NE Claureen River c. 120m to the SE. A circular overgrown area (diam. c. 30m) defined by a stone spread (at N: Wth 3m; H 0.4-0.8m; at E: Wth 2m; H 0.4m). There are no visible facing stones and an original entrance was not identified.

CL033-078----
Class: Enclosure
Townland: SHANVOGH
Description: Situated on a gentle SE-facing slope down to the Claureen River c. 250m to the SE. Hachured as a circular enclosure (diam. c. 35m) on the 1842 ed. of the OS 6-inch map and as a circular feature (diam. c. 25m) on the 1921 ed. Described as a cashel with a portion of wall (H c. 2m) at W (Ua Cróinín survey 1988, SMR file). On inspection in 2000 it was not visible at ground level.

The field system (CL033-163003-) located within the south end of the 1km study area was identified and excavated during archaeological investigations in advance of the construction of the N18 Ennis bypass. This site was associated with an early medieval enclosure (CL033-163001-) also uncovered during the bypass excavations and this is located outside the southern end of the study area. A review of the location of the other cashel (CL033-114001-) within the study area on aerial and satellite images indicates that it remains extant and the potential that an internal hut (CL033-114001-) also survives intact within the enclosed area. A review of aerial images of the location of the ringfort (CL033-171----) within the study area revealed no obvious surface traces. While no published inventory information for this site exists, based on a description of a 2009 programme of archaeological investigations in advance of a proposed extension to Cahercalla Hospital, which is close to its location, it likely comprises a levelled bivallate (two enclosing banks and ditches) ringfort which remains *in situ* (**Appendix 12.2**; Licence 09E0170).

High and Late Medieval Periods

The arrival of the Anglo-Normans in the late 12th century broadly marks the advent of the Irish high medieval period which continued to c.1400 and was followed by the late medieval period which extended to c.1550. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and numerous villages and towns began to develop throughout the country, often within the environs of Anglo-Norman manorial centres which were defended by masonry castles. By the 15th century the native Irish chieftains and lords began to construct tower-house castles within their own landholdings as centres of territorial control. There are no known archaeological sites dating to either period located within the study area and there is also little historical information on the settlement and land-use patterns within the study area during these periods. The proposed development site is located c.1.2km outside the western end of the Zone of Notification around the medieval core of Ennis town, as designated by the National Monuments Service, and it likely formed part of the settlement's agricultural hinterland during this period.

Post-Medieval and Early Modern Periods

The centuries following 1550 comprise the post-medieval period which continued into the middle of the 19th century and the period thereafter is often described as early modern. The first century of the post-medieval period was a turbulent time in Ireland history and saw a prolonged period of wars between the 1560s and 1603 with further conflicts arising during the Cromwellian Wars (1649–53). This period saw the extensive dispossession of forfeited Gaelic lands and the final disintegration of the Gaelic order in the early 17th century followed the Battle of Kinsale (1601), the conclusion of the Nine Years War (1603) and the Flight of the Earls (1607).

The post-medieval period saw the development of high and low status stone houses throughout the Irish countryside and rural settlement clusters at this time typically consisted of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common as the 19th century progressed. An agricultural boom in the late 18th and early 19th centuries saw a rise in prices for both tillage and dairy produce and resulted in Irish landlords investing in extensive land improvement works within their holdings. This included widespread land drainage works, introduction of soil nutrients, grass planting and the enclosure of open lands into field systems that survive to the present-day. The popularity and success of potato farming contributed to a population boom during the 18th and early 19th centuries and its failure in the middle of the latter century was to have devasting consequences. The settlement pattern throughout much of the rural landscape was greatly affected by the Famine period and its aftermath which saw the depopulation of many areas. The following decades were marked by an increasing move away from small-scale subsistence farming towards more market-led pasture, assisted by the development of the Co-Op system, which also increased the extent of land reclamation of previously marginal lands.

The 17th century Down Survey records that the townlands of Keelty and Ballymacaula, in which the proposed development is located, formed part of the extensive landholdings of Barnabas O'Brien, earl of Thomond in 1641 and 1670. The study area is within the civil parish of Drumcliff which is described in *The Topographical Inventory of Ireland* (Lewis 1837) as containing lands that varied greatly in quality with about 240 acres of craggy pasture that might be easily converted into good arable land. The parish description makes no references to notable houses or monuments within the townland of Keelty and Ballymacaula

The recorded post-medieval archaeological sites within the study area have been described as follows by the Archaeological Survey of Ireland:

> *CL033-074----*
> *Class: House - 18th/19th century*
> *Townland: KILNACALLY*
> *Description: Situated on level ground at the bottom of a slight E-facing slope. Listed in the RMP (1996) as 'House – 17th century, possible'. On inspection in 2000 this was found to be a five-bay, one-storey farmhouse with loft and modern front porch, probably 19th century in date. No evidence of an earlier date was noted. Archaeological testing (Licence no. 06E0192) just c. 45m to the NE on a large site (c. 130m NW-SE; c. 130m NE-SW) produced no archaeological material (Delaney 2009, 581). Weir (1986, 163).*
>
> *CL033-081----*
> *Class: House - 18th/19th century*
> *Townland: CLOGHLEAGH*
> *Description: Situated on a slight platform on the floodplain on the E bank of the Inch or Claureen river. Listed in the RMP (1996) as 'House – 17th century, possible'. On inspection in 2000 this was found to be a five-bay, two-storey house dating to the 18th century with a later porch added. The earliest date cited in the Irish Historic Towns Atlas for the house is 1795 (Ó Dálaigh 2012, 24). Weir (1986, 146-7).*
>
> *CL033-170----*
> *Class: Kiln - lime*
> *Townland: KEELTY*
> *Description: Situated on a NW-facing slope overlooking the floodplain of the Claureen river. A 19th-century limekiln was excavated in 2004 in advance of the construction of the N18 Ennis bypass (Licence no. 04E0025). The kiln was rectangular in plan (5.7m x 6.6m; H 4.7m) and constructed of limestone blocks, roughly dressed and bonded with*

lime mortar. The kiln had a flat upper surface with a centrally located flue tapering down to a horizontal furnace chamber. (Hull 2007; Bermingham et al. 2012, 96-100)

Database of Irish Excavation Reports

The Database does not contain any entries for licensed archaeological investigations within the proposed development site but does include a number of entries for examples within the surrounding 1km study area, which included the archaeological excavations carried out as part of the N18 Ennis bypass scheme. A pre-construction programme of archaeological test trenching was carried out at the location of the housing estate adjoining the south end of the proposed development and nothing of archaeological significance was identified (**Appendix 12.2**; Licence 17E0336). Archaeological investigations of two residential developments in lands further to the east of the proposed development also revealed nothing of archaeological significance (**Appendix 12.2**; Licences 06E1223 and 03E1029). Archaeological test trenching in advance of a proposed extension to Cahercalla Hospital revealed sub-surface remains of a ringfort which has been added to the SMR (CL033-171----) (**Appendix 12.2**; Licence 09E0170).

Summary details on the archaeological sites discovered during the bypass investigations within the study area are provided above and the full database entries for all investigations within the study area are provided in **Appendix 12.2**.

12.2.3.2 Designated Architectural Heritage

There are no Protected Structures, or NIAH-listed structures, located within the site boundary. There are two country houses listed in the Record of Protected Structures located within the surrounding 1km study and as detailed in Table 12.6 and mapped in Figure 12.1, neither are located within 350m of the boundary of the proposed development. The review of historic cartographical sources provided below (**Section 12.2.3.3**) indicates that the demesne lands or any curtilage features associated within these two houses did not extend into the proposed development site or its close environs.

Table 12.6: Designated Architectural Heritage Structures within the Study Area

RPS no.	NIAH	Name	ITM E	ITM N	Distance from development
045	20403310	Cahercalla House	532375	676241	355m to south
850	-	The Hermitage	532630	677558	420m to northeast

These two country houses have been described as follows in the Record of Protected Structures published in the County Clare Development Plan 2017-2023:

Cahercalla House (RPS 045)
Detached five-bay two-storey house, c.1760, with single-bay pedimented central breakfront having single-bay single-storey flat-roofed projecting porch with moulded cornice, consoled entablatures over ground floor openings, moulded architraves to first floor openings and consoled eaves; renovated and extended, 1953, comprising fourteen-bay three-storey flat-roofed wing to left and six-bay two-storey wing to right having single-bay single-storey gabled projection to front; now in use as hospital. Detached three-bay single-storey outbuilding with bipartite window openings.
Categories of special interest: Architectural, Materials, Setting

Hermitage (RPS 850)
Two-storey five-bay gable-ended house, c.1680 with a central porch-protected front door. One-and-a half-storey lean-to wing attached to the west end and a small return to the rear. Yard and utility buildings to west and southwest. There is a walled garden and a miniature three-bay gate lodge on the east side of the entrance gate. Marked

on 1st edition OS map and is named Hermitage. The house is also an archaeological Monument. RMP site (CL033-081) 17th century house. Repaired c.2005.

12.2.3.3 Cartographic Review

The cartographic sources examined for the study area comprised the first edition 6-inch Ordnance Survey (OS) map (published 1842) (Figure 12.2) and the 25-inch OS map (published 1897) (Figure 12.3). The online archive for the 17th century Down Survey mapping was consulted and records that the maps for the area were destroyed in the early 18th century[2]. The proposed development site is shown as an area of vacant farmland with sub-rectangular fields on both the 6-inch and 25-inch editions OS maps.

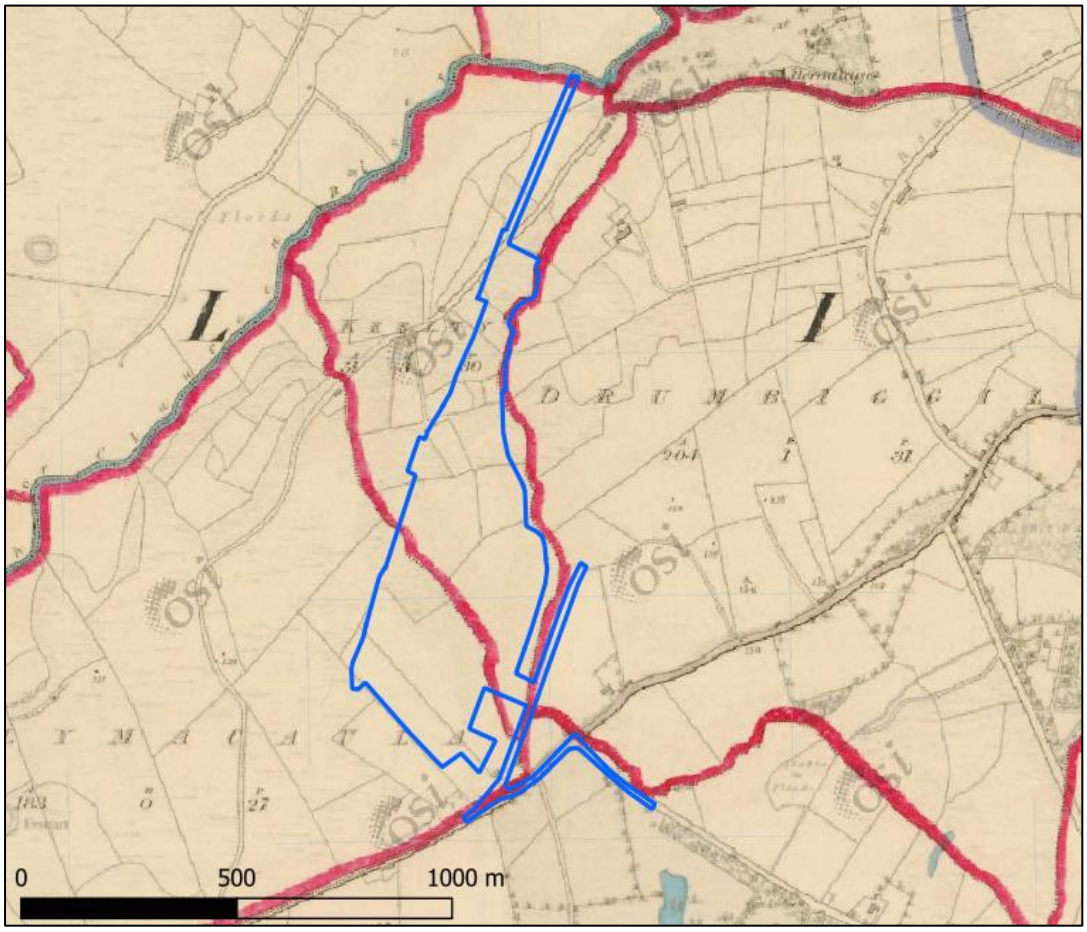

Figure 12.2: Extract from 6-inch Map [OSI licence ref. 0003322]

[2] http://downsurvey.tcd.ie/down-survey-maps.php#bm=Islands&c=Clare

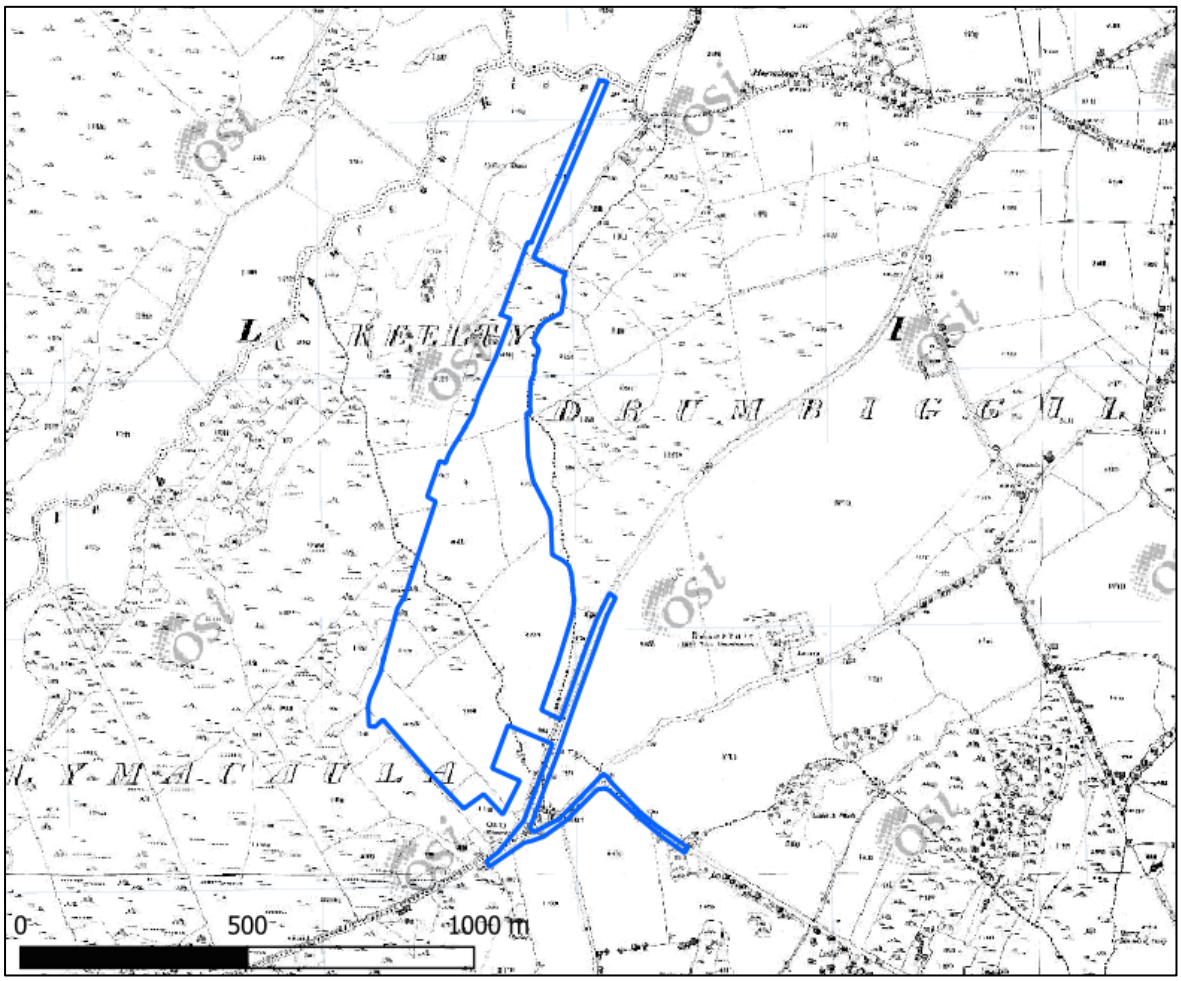

Figure 12.3: Extract From 25-inch O.S Map (OSI licence ref. 0003322)

12.2.3.4 Review of Aerial, Satellite and LiDAR Imagery

A review of publicly accessible aerial, satellite and LiDAR sources published by the Ordnance Survey of Ireland, Google, Bing Maps and the Geological Survey of Ireland (LiDAR) was undertaken in order to assess if any traces of potential unrecorded archaeological sites were visible within the proposed development site. The reviewed images all show the area within the proposed development site occupied by vacant, enclosed pasture fields and no evident traces of any potential unrecorded archaeological sites were noted. The detail on the LiDAR imagery shows a series of regularly spaced linear marks extending through a number of the southern fields which are likely the result of agricultural activity, perhaps cultivation furrows or land drains. The reviewed imagery demonstrates the layout of the fields within the site has not been significantly altered since the publication of the historic OS maps and the main changes to the surrounding lands are the presence of modern housing developments to the south and east as well as the golf course to the east and the Ennis bypass to the west.

Figure 12.4: Aerial Image of Proposed Development Site (source: Google maps) with field numbers assigned during site inspection indicated (please cross-reference with Appendix 12.2)

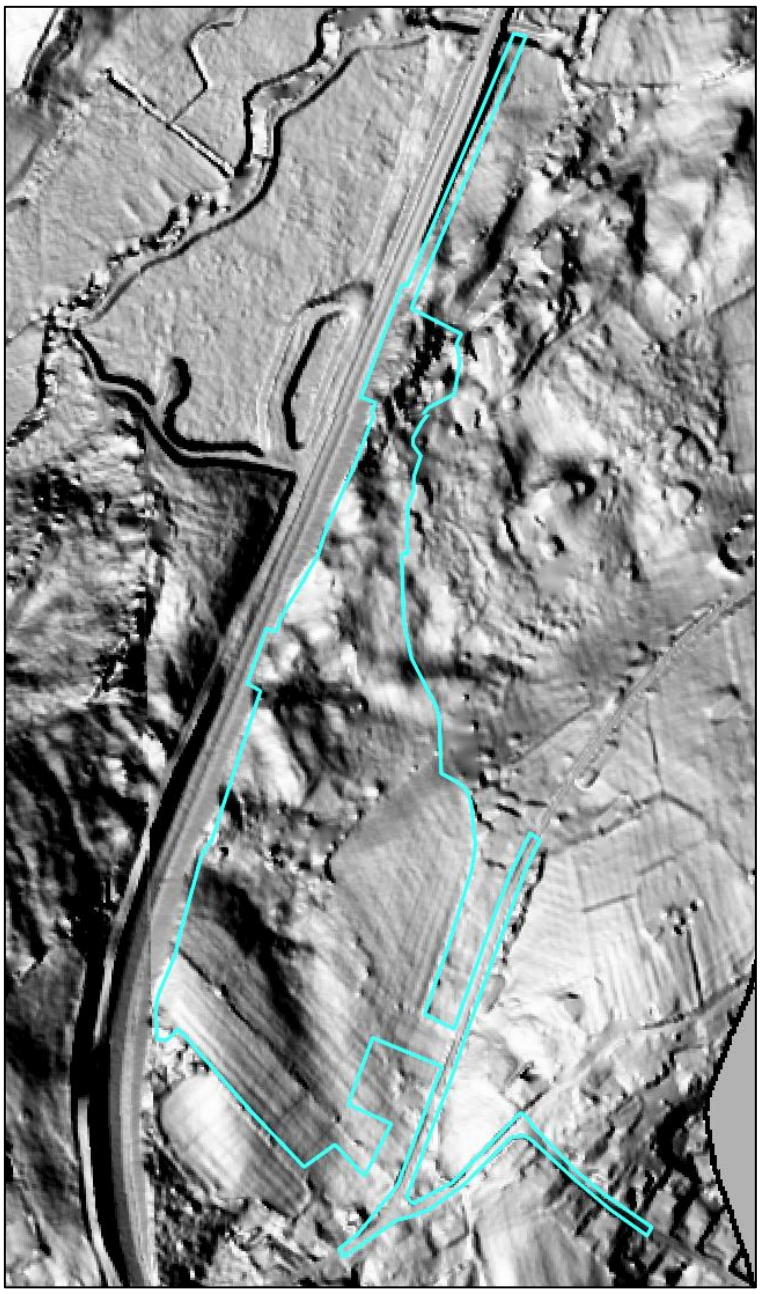

Figure 12.5: LiDAR Image of the Proposed Development Site (source: Geology Survey Ireland)

12.2.3.5 Undesignated Cultural Heritage Assets

While encompassing the archaeological and designated architectural heritage resource, cultural heritage also includes various undesignated assets such as settlements, demesne landscapes, vernacular structures, townland boundaries, folklore, placenames and historical events. There are no extant vernacular buildings, or structures of any date, located within the proposed development site and it does not form part of a historic demesne landscape.

Townlands are the smallest unit of land division in the Irish landscape and many preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The layout and nomenclature of Irish townlands was recorded and standardised by the work of the Ordnance Survey in the 19th century. The Irish translations of the townlands names often refer to natural topographical features, but name elements may also give an indication of the presence of past human activity within the townland, e.g.,

dun, lios or rath indicate the presence of a ringfort while temple, saggart, termon or kill record an association with a church site. The Irish origins and translations for the townlands within the study area were sought from the Placenames Database (www.logainm.ie). The proposed development site extends into two townlands: Ballymacaula and Keelty. The townland name of Ballymacaula derives from the Irish *Bhaile Mhic Amhlaidh*, which translates as McCauley's homestead while the townland name of Keelty derives from the Irish for wood (*coillte*). A series of northwest to southeast orientated field boundaries extending through the proposed development site form part of the boundary between these two townlands.

12.2.4 Field Survey

The proposed development site and its environs was inspected in July 2021 and May 2022 and were assessed in relation to existing land use, vegetation cover and the potential for the presence of unrecorded archaeological features and other features of cultural heritage interest. Extracts from the photographic record of the site survey are provided in **Appendix 12.1**. The lands within the site comprise vacant rough pasture fields within an area of undulating terrain containing areas of bedrock outcropping. The field boundaries comprise overgrown low, random rubble, drystone walls with a modern fence extending along the side of the N85 road which has truncated the west end of a number of adjacent fields. There are no structures of any date located within the site and no surface traces of any potential unrecorded archaeological sites were noted during the inspection. The townland boundary between Keelty and Ballymaculla extends in a northwest to southeast orientation through the southern half of the site and comprises an overgrown field boundary of drystone construction. The back gardens of a row of detached modern houses extends along the southern end of the eastern boundary and the golf course adjoins the northern end of this side of the proposed development. A cut section of the N85 road extends along the west side of the proposed development while a modern housing estate is located to the south.

12.2.5 Summary

There are no recorded archaeological sites within the proposed development site and no surviving examples are located within 215m of its boundary. There are no National Monuments in State Care located within the surrounding 1km study area and the proposed development is located 1.2km outside the Zone of Notification around the historic core of Ennis town. There are ten recorded archaeological sites located in private lands within study area, and none comprise types with potential visually sensitive alignment attributes, such as megaliths or stone circles. Three of the sites in the study area were identified and excavated in advance of the construction of the N18 Ennis bypass and no longer remain at their recorded locations. The other sites within the study area are types common within the Irish landscape and are in varying states of preservation. They are of likely high value although this cannot be ascertained for levelled examples without recourse to archaeological excavation. While no evidence for potential unrecorded archaeological sites within the proposed development boundary was identified during the desktop study and field surveys undertaken as part of this assessment, the potential for the presence of unrecorded, sub-surface archaeological sites within green field lands cannot be discounted.

There are no Protected Structures, curtilage features or NIAH-listed buildings located within the proposed development site. There are two Protected Structures, which are of likely high value, located within the surrounding 1km study area and neither of these are located within 355m of the site boundary. In addition, the proposed development site is not located within an Architectural Conservation Area.

The only feature of cultural heritage interest identified within the proposed development site is a section of the townland boundary between Keelty and Ballymacaula which comprises a series of field boundaries. This boundary comprises a feature of local (low) cultural heritage value.

12.3 Predicted Impacts

12.3.1 Do Nothing Scenario

A 'Do Nothing Scenario' will see the continued preservation of recorded and potential cultural heritage features within the study area.

12.3.2 Construction Phase

There are no recorded archaeological sites within the proposed development lands and no surviving examples are located within 215m of its boundary. The construction phase of the proposed development will, therefore, have no predicted impact on the known archaeological resource. While there was no evidence for any unrecorded archaeological sites within the proposed development site identified during the desktop study and field inspection, the potential for the survival of unrecorded, sub-surface archaeological features and artefacts within its boundary cannot be discounted. As the existence, nature and extent of any unrecorded archaeological features or artefacts within the proposed development site are unknown; the significance of potential construction phase impacts cannot be quantified but ground excavation works will have the potential to result in permanent, direct, negative effects on any such remains and this will require mitigation.

There are no designated architectural heritage structures located within the proposed development lands or within 350m of its boundary and it contains no undesignated structures of architectural heritage interest. In addition, the proposed development site is not located within, or in the close environs of, an Architectural Conservation Area. The construction phase of the proposed development will, therefore, result in no predicted impacts on the architectural heritage resource.

There are no undesignated vernacular structures, demesne lands, or historic settlements located within the proposed development site and no intangible attributes, such as historical or folklore associations, were noted during the assessment. A section of the townland boundary between Keelty and Ballymacaula extends through the interior of the proposed development site and continues outside its boundary. The construction phase of the proposed development will result in a direct, permanent, slight, negative impact on this element of the undesignated cultural heritage resource.

12.3.3 Operational Phase

There are no extant recorded archaeological sites within the proposed development site, and none are located within 215m of its boundary. The proposed development will, therefore, have no predicted impacts on the setting of any recorded archaeological sites during the operational phase. Following the successful implementation of archaeological mitigation measures presented in Section 11.4, it is predicted that no impacts will arise in relation to the potential archaeological resource within the proposed development site during the operational phase.

There are no designated architectural heritage structures located within the proposed development lands or within 350m of its boundary, it is not located within an ACA and it contains no undesignated structures of architectural heritage interest. The proposed development will, therefore, have no predicted impacts on the architectural heritage resource during the operational phase.

The only undesignated cultural heritage feature within the proposed development site comprises field boundaries forming a section of the townland boundary between Keelty and Ballymacaula. Following the successful implementation of archaeological mitigation measures presented in Section 12.4, it is predicted that no impacts will arise in relation to the undesignated cultural heritage resource during the operational phase.

12.3.4 Cumulative

There are no extant recorded archaeological sites or designated architectural heritage structures located within the proposed development site or within its close environs. A number of previously unrecorded archaeological sites were identified during archaeological investigations carried out as

part of the construction of the N85 Ennis bypass project and all were preserved in record through systematic archaeological excavation. A programme of archaeological investigations within the property immediately to the south of the proposed development was carried out as part of a residential development (Clare County Council ref. 17237) in that area and nothing of archaeological significance was identified (**Appendix 12.2**; Licence 17E0336). Given the absence of any recorded archaeological sites or designated architectural heritage structures within the site and following the application of the mitigation measures presented in Section 12.4 of the chapter, it is concluded that the proposed development will not act in combination with other developments to result in any significant cumulative impacts on the cultural heritage resource of the area.

12.4 Mitigation Measures

12.4.1 Construction Phase Mitigation

Given the scale and extent of the proposed development within a green field location, a programme of archaeological test trenching, under licence by the National Monuments Service, will be carried within the proposed development site in advance of the construction phase. This will include test trenching of the section of the townland boundary between Keelty and Ballymacaula located within the proposed development and a written and photographic survey of this feature will also be carried out. In the event that any sub-surface archaeological deposits, features or artefacts are identified during these site investigations, their locations will be recorded and securely cordoned off while the National Monuments Service are notified of the discovery and consulted to determine further mitigation measures, which may entail preservation in situ by avoidance or preservation by record through a systematic archaeological excavation.

There are no structures of architectural heritage interest located within the proposed development site or its close environs and no mitigation measures for this element of the cultural heritage resource are required.

12.4.2 Operational Phase Mitigation

All required mitigation measures will be enacted prior to and during the construction phase and, therefore, no cultural heritage mitigation measures during the operational phase of the proposed development are predicted.

12.4.3 Monitoring

There are a number of obligatory processes to be undertaken as part of applications to the National Monuments Service for licences to carry out archaeological test trench excavations and these will allow for monitoring of the successful implementation of mitigation measures. A detailed method statement stating the proposed strategy for the site investigations will accompany the submitted licence application which will clearly detail the extent of the archaeological works and outline the processes to be enacted in the event that any archaeological features are encountered. Reports on the archaeological site investigations will then be submitted to the National Monuments Service, the National Museum of Ireland and the Planning Authority which will clearly describe the results of all archaeological works in written, mapped and photographic formats.

12.5 Residual Impacts

The proposed development site and its close environs do not contain any extant recorded archaeological sites or designated architectural heritage structures and no residual impacts on these elements of the cultural heritage resource are predicted. The mitigation measures presented in Section 12.4 will provide for either the preservation in situ of any currently unknown archaeological features within the proposed development site or the proper and adequate recording of this resource by full archaeological excavation. Preservation in situ shall allow for a negligible magnitude of impact resulting in a potential not significant/imperceptible significance of effect in the context of residual

impact on the unrecorded archaeological resource. Preservation by record shall allow for a high magnitude of impact, albeit ameliorated by the creation of a full and detailed archaeological record, the results of which shall be publicly disseminated. This shall result in a potential slight/moderate range of significance of effect in the context of residual impacts on the unrecorded archaeological resource.

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Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

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CHAPTER 13

Population and Human Health

August 2022

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13 Population and Human Health

13.1 Introduction

This chapter of the EIAR assesses the potential impacts of the proposed development on population and human health that are not covered elsewhere in the EIAR. It also details the proposed mitigation measures where necessary. The potential impacts on, and mitigation measures for population and human health were assessed under the following headings: Do Nothing Scenario, Human Health (including Health and Safety), Population and Economic Activity, and Local Amenity.

13.1.1 Author Information and Competency

This chapter was prepared by the following;

Aoife Browne (BSc Arts of Sociology and Geography, MPlan Planning and Sustainable Development) of McCutcheon Halley Planning Consultancy. She holds qualifications in planning and sustainable development and is a Member of the IPI. She has worked with multi-disciplinary teams on several projects and has provided input to a variety of development projects.

13.1.2 Reference to Guidelines Relevant to Discipline

This chapter has been prepared having regard to the following guidelines:

- Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency (EPA), draft August 2017).
- Advice Notes for Preparing Environmental Impact Statements (EPA, draft September 2015);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

13.1.3 Methodology

The Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017) state that:

> *'In an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.'*

Recital 22 to the EIA Directive provides that "*In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases*".

The EPA advice notes (EPA, 2015) recommend considering the following issues when assessing the potential impacts and effects of a proposed development on Population and Human Health.

- Economic Activity likely to lead to projects - will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?
- Social Consideration - will the development change the intensity of patterns and types of activity and land use?
- Land-use - will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings?

- Tourism – will the development affect the tourism profile of the area?
- Health – have the vectors through which human health impacts could be caused been assessed, including adequate consideration of inter relationships between those assessments.

For the purposes of this assessment impacts on tourism have been scoped out, as the proposed project comprises a residential development in a built-up area, and the site does not have any intrinsic tourism value and is not in proximity to any important tourism or amenity resources.

The appraisal of the likely significant effects of the proposed development on population and human health was conducted by reviewing the current socio-economic environment within Ennis and its wider area. This comprised site visits and visual assessments of the proposed site and the surrounding area, as well as an analysis of aerial photography and Ordnance Survey (OS) mapping.

The EIAR study area incorporates the red-line development boundary of the site and the immediate areas surrounding the site. Information was gathered with respect to the demographic and employment characteristics of the resident population within the relevant catchment area, sourced from the 2011 and 2016 Censuses. The data included information on population, structure, age profile and household size, number of persons at work and the unemployment profile. A desktop survey of the following documents and websites also informed this:

- Clare County Development Plan (CDP) 2017 - 2023.
- Central Statistics Office (CSO) website www.cso.ie;
- Department of Education and Sciences (DES) website www.education.ie.

Consultations with both the local authority and statutory bodies were also used to ensure that environmental issues, including socio-economic, recreational and amenity issues relating to the proposed development were addressed (see Chapter 1 Introduction for details).

Detailed consideration was given to the surrounding area and the potential receptors and receiving environment that might be affected by the proposed development. These are discussed in detail in Section 14.4 and include;

- the surrounding residents/homes,
- the community facilities and services in the area,
- local schools and childcare facilities,
- local amenities such as community groups, clubs, and societies, and
- temporary receptors such as pedestrians or drivers passing the site (although these impacts are generally considered to relate to visual impact, covered in Chapter 4 Landscape and Visual Impact).

13.1.4 Difficulties Encountered in Compiling Information

No difficulties were encountered in accessing information during the preparation of this chapter.

13.2 Description of Existing Environment

The following provides a description of the receiving environment, with a focus on demography, land use and local amenity. A detailed description of the project is provided in Chapter 2.

13.2.1 Demography

Ennis and its environs are one of the key growth areas in Metropolitan Clare with the vision for the Metropolitan Area, as set out in the Clare County Development Plan 2017- 2023, being to facilitate its development as a main engine of population and employment growth in the Mid-West region. Under Irelands National Spatial Strategy (NSS) the entirety of Clare was designated as a Hub City and includes Ennis and its surrounding environs. According to the strategic context statement of the Clare County Development Plan 2017- *2023 "to facilitate the housing needs of the existing and future population of County Clare through the management of housing development throughout the County in accordance with the Settlement Strategy;"* (CDP 4.2).

Clare County Council, through the development of an Ennis 2040 Economic and Spatial Strategy, has set out ambitious growth targets and proposes the prioritisation of sustainable economic activities that will grow our population on average by 1.6% per annum and deliver an additional 5,000 jobs by 2040. As a long-term strategy, it will inform and drive the economic, social, and physical development of our county town, Ennis, over the next 20 years.

The proposed development is located within the townland of Ballymacaula within Ennis town which is identified as a hub town in the Clare County Development Plan 2017. The subject site is situated to the west of the N85 (Ennis Bypass) is approximately 1.4km from Ennis Town Centre. The total site area comprises 11.09ha (27.4 acres) hectares. The net developable area of the site is 8.9 ha. There are a few existing one-off houses located immediately east of the subject site. To the northeast of the site lies the Ennis Golf Club.

The site is within easy walking distance of several commercial, recreational and community facilities including local shops, Ennis golf course, Ennis Showgrounds, and local schools. The site is bounded to the north by a new residential development, to the west and south by agricultural lands. A recent residential development under construction is located to the south of the site. The native hedgerows which define the existing field boundaries and are part of the local green infrastructure network will be retained where possible. The site will be accessed via the Circular Road which runs to the southeast of the site. The site is located within the Ennis Rural (ED), which incorporates the relevant residential areas mentioned above as well as part of the surrounding rural hinterland (see Figure 13.1). This ED along with the Ennis Urban 1-4 EDs have been used in the assessment of the Census and Population Statistics 2016 and includes a comparative analysis with 2011 where relevant, as well as National, County and City averages across a number of datasets.

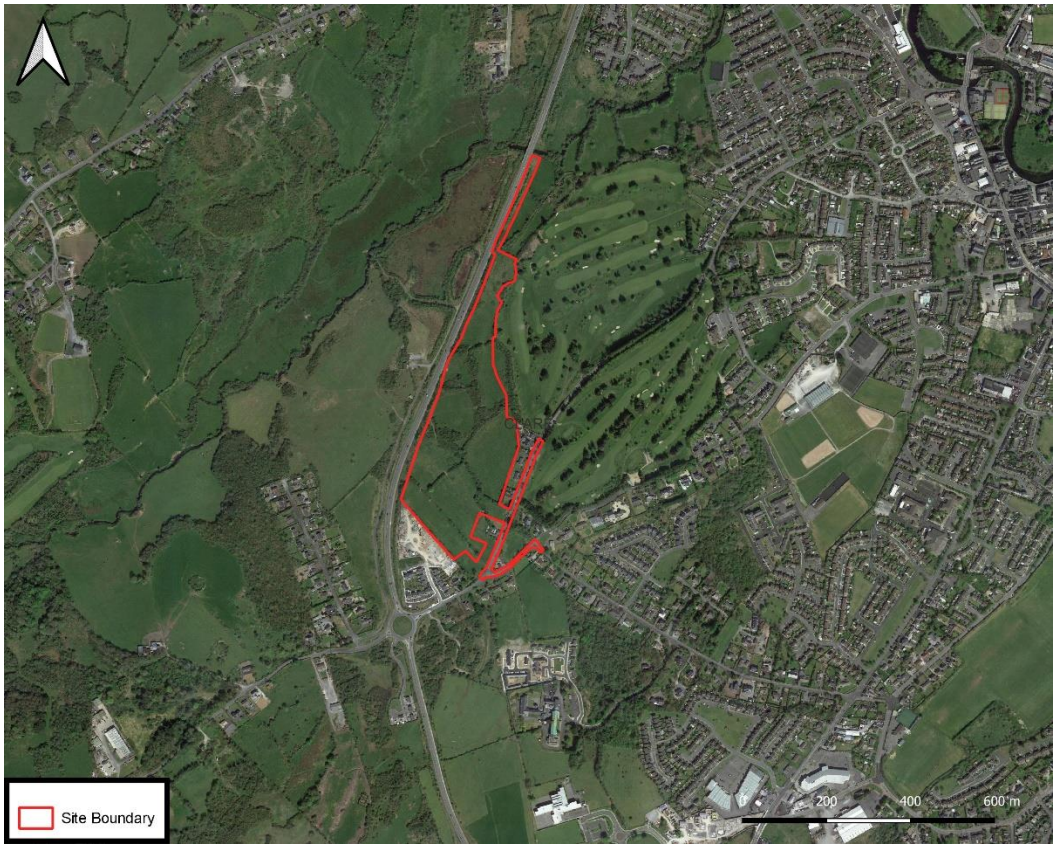

Figure 13.1: The subject site and the subsequent wider study area.

Population

The Population and Labour Force Projections 2017 – 2051 Report released by the CSO in 2018 identifies that Ireland's population is projected to grow substantially by 2051, from 4.74 million in April 2016 to 6.69 million by 2051. Population growth will be influenced by inward migration and fertility, but even with low inward migration and declining fertility, Ireland's population is still expected to reach 5.58 million in 2051.

The National Planning Framework (NPF) compromises of counties Clare, Limerick and much of Tipperary. Future growth within this area is based on connectivity, quality of life to secure strategic investment and housing development, aligning with the projected increases outlined above.

The Regional Spatial and Economic Strategy (RSES) for the Southern Region which came into effect in January 2020 identifies that the Southern Region is the second most populated Regional Assembly area and that all 10 local authority areas within the region have experienced growth at varying levels since 2006. Population projections anticipate large increases in the 15–24-year (+26%), 45–64-year (+14%) and 65+year (+56%) age groups between 2016 and 2031. The 0-14 year and 25–44-year age groups. The Ennis Municipal District Plan seeks by 2030 to reach a population of 33,010 people, aligning with both the targeted figures within the RSES and NPF.

Table 13.1: Clare County Population Target and Housing Requirements

Area	Core Strategy Population Allocation	Housing Requirement	Existing Zoning	Proposed Zoning	Housing Yield (Residential Lands)	Shortfall/Excess
Clare County	33,497 persons by 2023		134.65*ha	137.20 ha		

*Figure accounts for both Low Density Residential Zoning and Residential Zoning

Household Size

The study area, which is comprised of the Ennis Rural ED, Ennis Urban 1 ED, Ennis Urban 2, Ennis Urban 3 and Ennis Urban 4 ED, recorded a combined population of 22,671 in 2016 which represents a 1.6% increase on 2011 levels (i.e. 22,324 people). Regarding household size, the Ennis Urban 1-4 EDs were way below the Ennis Rural ED, county and state averages for the same period. The Ennis Rural ED had an average household size of 2.7% which was the same for the county and state for the same period. There was a .7 difference between the average for Ennis Urban 4 and the county and state figures. (See Table 13.2).

Table 13.2: Average Household Size in 2016.

Area	Households	Persons	Average Household Size
Ennis Rural ED	6,506	17,452	2.7
Ennis Urban 1 ED	606	1,440	2.4
Ennis Urban 2 ED	855	1,825	2.1
Ennis Urban 3 ED	98	211	2.2
Ennis Urban 4 ED	645	1,305	2.0
Clare County	43,469	116,920	2.7
State	1,702,289	4,676,648	2.7

In terms of demographic split, the Census 2016 found that 8.3% of the population of Ennis Rural, 4.6% of Ennis Urban 1, 5.8% of Ennis Urban 2, 4.1% of Ennis Urban 3 and 3.7% of Ennis Urban 4 were of pre-school going age (i.e. 0-4 years). These figures are below the figures identified County-wide (6.6%) and across the State (6.9%) for persons within this age category, however Ennis Urban 4 being considerably lower than these averages. In terms of primary school aged children (i.e. 5-11 years), it was identified that 10.9% of the population of Ennis Rural ED were within this category. Additionally, 8.5%, 8.9%, 5.9%, 6% of the populations of Ennis Urban 1, Ennis Urban 2, Ennis Urban 3 and Ennis Urban 4 were also in this category. The percentage of the population identified as being of post-primary age (i.e. 12-18 years) was 9.4% for Ennis Rural ED, 9% for Ennis Urban 1 ED, 8.3% for Ennis Urban 2 ED and 6.8% for Ennis Urban 3 ED and 5.3% for Ennis Urban 4. These figures are slightly lower than the same figures identified at State level with 10.2% of the population aged between 5-11 years and 9.2% aged 12-18

years with the exemption of the Ennis Rural ED which had a higher portion of primary and post-primary school children. Across all groups, certain population figures in the EDs (Age 19-34) were much greater than Clare County with the exemption of Ennis Rural ED, which further illustrates the popularity of the city's suburbs as an area for starter and family housing, see Table 13.3.

Table 13.3: Demographic Breakdown of Population

Area	Age 0-4	Age 5-11	Age 12-18	Age 19-34	Age 35-64	Age 65+	Total Population
State	331, 515	484,368	435,913	990,618	1,881,884	637,567	4,761,865
As percentage of total population	6.9%	10.2%	9.2%	20.8%	39.5%	13.4%	N/A
Clare County	7,901	12,547	11,679	20,189	48,846	17,655	118,817
As percentage of total population	6.6%	10.6%	9.8%	17%	41.1%	14.9%	N/A
Ennis Rural ED	1,477	1,935	1,667	3,351	7,223	2,056	17,709
As percentage of total population	8.3%	10.9%	9.4%	18.9%	40.8%	11.6%	N/A
Ennis Urban 1 ED	67	124	131	257	606	267	1,452
As percentage of total population	4.6%	8.5%	9%	17.7%	41.7%	18.4%	N/A
Ennis Urban 2 ED	105	161	151	420	743	230	1,810
As percentage of total population	5.8%	8.9%	8.3%	23.2%	41%	12.7%	N/A
Ennis Urban 3 ED	9	13	15	43	74	68	222
As percentage of total population	4.1%	5.9%	6.8%	19.4%	33.3%	30.6%	N/A
Ennis Urban 4 ED	55	88	79	291	586	379	1,478
As percentage of total population	3.7%	6%	5.3%	19.7%	39.6%	25.6%	N/A

Ennis Urban 2 has a slightly higher proportion of young adults (i.e. aged 19-34) at 23.2% than is noted comparatively across the State (20.8%), however this figure is slightly higher than the combined Clare County (17%).

Travel Trends

Demographic analysis of travel trends, as outlined in Table 13.4, within each of the four EDs indicate that the majority of people commute daily to Ennis and the surrounding Environs, and other employment centres in the immediate vicinity, such as Ennis Town Centre. 71.9% of the population of Ennis Rural travel for ½ hour or less, with a further 12.7% travelling between ½ hour and ¾ hour. 63.9%

of the population of Ennis Urban 2 ED which is the closest ED to the proposed development travel for ½ hour or less, and an additional 9% travelling between ½ hour and ¾ hour. The study area position as an important residential base for workers and families within the Ennis Town Centre and its environs is further reinforced when considering the level of retired population (i.e., those aged 65 and above) is just 11.6% in the Ennis Rural ED, which is considerably lower than those for the combined Clare County (14.9%) and State (13.4%).

Table 13.4: Travel Time for the Ennis Municipal District

Time Taken to Travel to Work, School or College	Ennis Rural: Total Population Aged 5 years and over		Ennis Urban 1: Total Population Aged 5 years and over		Ennis Urban 2: Total Population Aged 5 years and over		Ennis Urban 3: Total Population Aged 5 years and over		Ennis Urban 4: Total Population Aged 5 years and over	
Under 15 mins	5,037	44.6%	361	47.4%	409	41.6%	38	30.4%	342	49.6%
1/4 hour - under 1/2 hour	3,084	27.3%	200	26.3%	219	22.3%	18	14.4%	171	24.8%
1/2 hour - under 3/4 hour	1,430	12.7%	68	8.9%	88	9%	11	8.8%	91	13.2%
3/4 hour - under 1 hour	465	4.1%	17	2.2%	23	2.3%	5	4%	14	2%
1 hour - under 1 1/2 hours	392	3.5%	25	3.3%	35	3.6%	2	1.6%	22	3.2%
1 1/2 hours and over	156	1.4%	5	0.7%	10	1%	1	0.8%	7	1%
Not stated	721	6.4%	85	11.2%	199	20.2%	50	40%	42	6.1%
Total	**11,285**		**761**		**983**		**125**		**689**	

Tenure

With regard to tenure, the figures outlined for owner occupied households and those renting in each of the four EDs in Table 13.5 are vastly different especially Ennis Rural and Ennis Urban EDs, which have a very high owner occupied percentage. In the Ennis Rural ED where the proposed development site is situated, 32.3% of households are in rental accommodation (either from a private landlord, local authority or voluntary body) while 64.2% are owner occupied (including those with and without a mortgage). At State level 27.6% of households are renting while 67.6% are owner occupied. There is a large disparity between each of the EDs in the study area and Clare County with regards to rented accommodation. Overall, in Clare County 21.5% of households are used as rented accommodation with Ennis Urban 1 being the closest to this figure at 28.6%. The 64.2% of owner-occupied housing in the Ennis Rural ED is an indicator that housing is less expensive than in Ennis Town Centre and that demand is very high for purchasing new homes (just 3.4% less owner occupied homes than the State average). Table 13.6 suggests that the level of vacancy in the study area is vastly different across the entirety of the study area, with a high of 24.8% at Ennis Urban 3 ED and a low of 9.2% at Ennis Rural ED. The vacancy in Ennis Rural ED, where the site is situated is 9.2% which is only .1% more than the state average, however this figure is significantly lower than the county which is 16.7%.

Table 13.5: Demographic breakdown of Household Tenures

Permanent private households by type of occupancy	Ennis Rural ED		Ennis Urban 1 ED		Ennis Urban 2 ED		Ennis Urban 3 ED		Ennis Urban 4 ED	
Owner occupied with mortgage	2,200	33.8%	124	20.5%	90	10.5%	6	6.1%	99	15.3%
Owner occupied no mortgage	1,977	30.4%	270	44.6%	194	22.7%	43	43.9%	263	40.8%
Rented from Private Landlord	1,633	25.1%	89	14.7%	208	24.4%	33	33.7%	168	26%
Rented from Local Authority	408	6.3%	81	13.4%	215	25.2%	1	1%	93	14.4%
Rented from Voluntary Body	61	0.9%	3	0.5%	35	4.1%	0	0%	2	0.3%
Occupied free of rent	69	1.1%	17	2.8%	6	0.7%	2	2%	10	1.6%
Not Stated	155	2.4%	22	3.6%	106	12.4%	13	13.3%	10	1.6%
Total	**6,503**		**606**		**854**		**98**		**645**	

Table 13.6: Vacancy Levels, Census 2016

	Total Permanent Dwellings	Vacant Dwellings	As percentage of Total Permanent Dwellings
State	2,003,645	183,312	9.1%
Clare County	55,779	10,925	19.6%
Ennis Rural ED	7,470	684	9.2%
Ennis Urban 1 ED	754	118	15.6%
Ennis Urban 2 ED	1,105	220	19.9%
Ennis Urban 3 ED	145	36	24.8%
Ennis Urban 4 ED	766	101	13.2%

13.2.2 Economic Activity

Employment

The Mid West Region is one of the key growth centres in Metropolitan Clare with the vision for economic growth, as set out in the National Planning Framework, being to facilitate its development as a main engine of population and employment growth in the Mid-West region.

The CSO releases quarterly publications on labour force estimates for the state (Table 13.7). The estimate for Q3 2021 indicated an annual increase in 9.8% or 221,200 in the year to the third quarter of 2020, bringing total employment to 2,471,200. This compares with an annual increase of 5.2% or 122,100 in employment in the previous quarter and an increase of 31.7 % or 565,533 in the year to Q2 2020, however the Q2 2020 figure has been adjusted and estimated by the CSO to consider the effects of Covid 19. Unemployment decreased by 30,100 (-16.8%) in the year to Q3 2021 bringing the total number of persons unemployed to 149,100.

According to the CSO data, this is the twenty eighth quarter in succession where unemployment has declined on an annual basis. The results are indicative of a growing economy, recovering from the most recent downturn. The Population and Labour Force Projections provided in Table 13.8 also indicate a recovering economy, with unemployment levels down significantly from 2011. However, it is acknowledged that given the situation at the time of preparation of this EIAR, the economic forecasts and any labour force projections will need to be revised.

Table 13.7: Results of CSO Labour Force Survey for the State Q3 2021

Indicator	Quarter 3 2021	Annual Change
Employed	2,471,200	+221,200
Unemployed	149,100	-30,100
In Labour Force	2,620,300	+191,100
Not in Labour Force	1,407,700	

Table 13.8: Labour Force Participation Rate

Area	Factor	2011	2016
State	Labour Force Participation Rate (%)	61.9%	61.4%
	Unemployment Rate (Rate)	19%	12.9%
Cork City	Labour Force Participation Rate (%)	54.4%	55.2%
	Unemployment Rate (Rate)	22.2%	15%
Cork County	Labour Force Participation Rate (%)	62.7%	61.6%
	Unemployment Rate (Rate)	14.8%	9.2%

13.2.3 Land Use and Amenity

The landscape in which the EIAR study area is located is categorised in the Clare County Development Plan 2017-2023

The proposed development is located within the townland of Ballymacaula within Ennis town which is identified as a hub town in the Clare County Development Plan 2017. The subject site is situated to the west of the N85 (Ennis By Pass) is approximately 1.4km from Ennis Town Centre. The total site area comprises 11.09ha (27.4 acres) hectares. The net developable area of the site is 8.9 ha. There are

a number of existing one-off houses located immediately east of the subject site. To the northeast of the site lies the Ennis Golf Club.

The subject site consists of green fields, which were in agriculture use. With regard to the land uses of the surrounding area, there are residential uses adjacent to the site to the west, with the site sharing its boundary to the west with the Ballymacaula View residential development. The Ennis Golf Club is located to the east of the site.

In the Ennis Municipal Plan there are two objectives that support landscape and amenity; Objective V3(a)13 *"To support the continued operation and future enhancement of existing tourism products and services in the Plan area"* and Objective V3(a)14 *"To prioritise the development of a walking and cycling path along the full line of the West Clare Railway within the Municipal District area, in collaboration with landowners and subject to the requirements of the Habitats Directive"* with these two objectives expected to be met over the duration of the plan.

Ennis, as part of the wider Clare County area, is identified as an area for consolidated residential growth within the Clare Metropolitan Area. The study site is in close proximity to the core of Ennis town and benefits from a wide selection of community facilities and services including a library, doctor, hospital and dentist clinics, shopping centres, post office, sport and community playing pitches, golf course, gyms, community centre and park, banks, churches of various denominations and several hotels including the Woodlands Hotel and Leisure Centre. There are also a number of educational facilities located in the area including creches, pre-schools, primary and secondary schools (see Figures 13.3 and 13.4, and Tables 13.10 and 13.11).

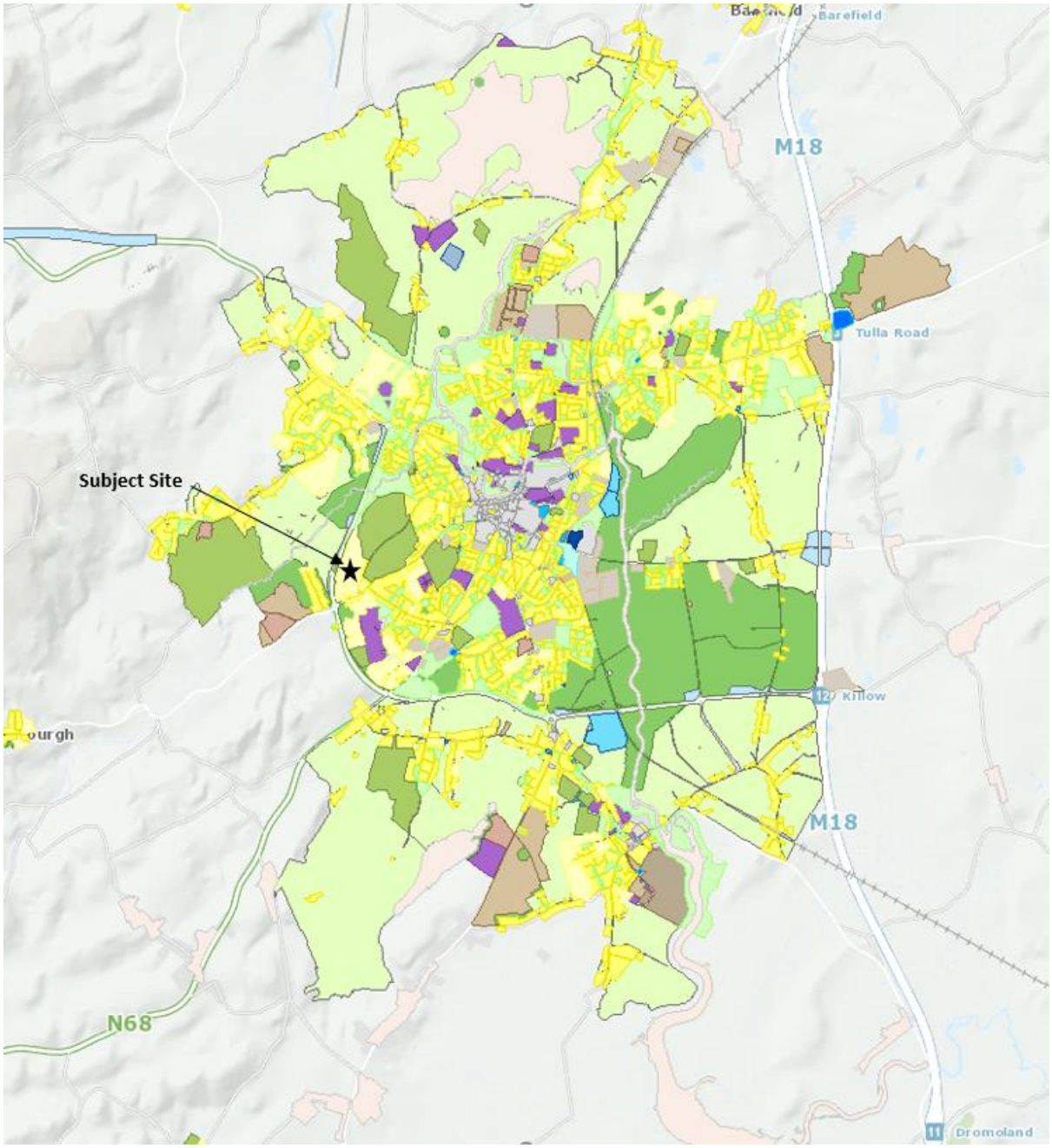

Figure 13.2: Ennis and the subject lands at Circular Road

13.2.4 Health

The CSO provides information on the perceived health of participants, rating health from Very Good to Bad. The Ennis ED had 48% of the population in "Very Good" or "Good" health, with a further 18% identifying their health was "Fair". The Pobal Deprivation index (Pobal is a government funded service) provides a method of measuring the relative affluence or disadvantage of a particular geographical area using data compiled from various censuses. The results of the 2016 Census identified the Ennis Rural ED as "marginally above average", with a deprivation index of 7.18. The CSO data provides background on socio-economic groups, and in the Ennis Rural ED in 2016 12.8% of people identified as "Employer Managers, Professional, or Lower Professional".

Table 13.9: Population Index

Deprivation Index of Catchment Area	Ennis Rural ED	Ennis Urban 1 ED	Ennis Urban 2 ED	Ennis Urban 3 ED	Ennis Urban 4 ED
ED ID	24,004.00	16,001.00	16,002.00	16,003.00	16,004.00
County	24.00	16.00	16.00	16.00	16.00
Pobal HP Index 2016	7.18	-11.59	-12.92	-4.89	-7.00
Pobal HP Description 2016	marginally above average	disadvantaged	disadvantaged	marginally below average	marginally below average
Population 1981	498.00	2,139.00	1,692.00	279.00	2,113.00
Population 1986	730.00	2,202.00	1,650.00	232.00	1,833.00
Population 1991	836.00	2,159.00	1,613.00	237.00	1,636.00
Population 1996	911.00	2,134.00	2,066.00	345.00	1,518.00
Population 2002	1,287.00	2,017.00	2,339.00	497.00	1,488.00
Population 2006	1,323.00	1,733.00	2,243.00	274.00	1,554.00
Population 2011	1,321.00	1,546.00	1,767.00	256.00	1,396.00
Population 2016	1,247.00	1,452.00	1,810.00	222.00	1,478.00
Population change % (2011-16)	-0.06	-0.04	0.04	-0.13	0.04
Age Dependency Ratio (%)	37.92	34.62	30.62	41.89	37.56
Lone parent ratio (%)	6.00	30.71	45.00	27.00	33.50
Prop. primary education only (%)	7.25	16.71	20.30	16.00	17.00
Prop. third level education (%)	50.23	26.34	17.65	35.77	21.35
Prop. local authority rented (%)	0.83	11.43	28.17	1.18	15.38
Unemployment rate - male (%)	7.57	28.77	35.30	12.07	24.72
Unemployment rate - female (%)	5.75	18.75	24.77	9.26	16.69

13.3 Identification of Principal Potential Receptors

In identifying potential impacts and receptors, consideration was given to the proposed residential scheme and the identified receiving environment. The principal potential receptors that will be affected by the development proposals have been identified as follows:

13.3.1 Local Residents

There are several existing residents surrounding the proposed site which have the potential to be impacted by the development, specifically the residents of:

- Temporary Receptors
- Several detached dwellings located along Circular Road
- Ennis Golf Course bounding the site to the Northeast

13.3.2 Community Facilities and Services

As previously stated, Ennis and its environs benefit from a wide selection of important community facilities and services which are identified as potential receptors. These include a strong network of community groups and clubs and includes the Clare Youth Service, which is run by a Youth Work Ireland, and provides a range of community services.

The Clare County library also assists and facilitates several other groups in the town including schools for additional educational resources, people involved in business start-ups through the Work Matters initiative. There are a number of crèches in the vicinity of the proposed development as well as a youth centre and GAA club. The site is central to sporting amenities which are provided at Circular Road the Ennis Golf Club. The settlement also has a network of amenity Greenways and Blueways which include the West Clare Railway Greenway.

With regard to childcare facilities, a total number of 5 services were identified within a 10-20 minute travel time of the EIAR study area (see Table 13.10).

The travel times were determined by using the distance and average journey times from Google Maps.

Table 13.10: Creche/Childcare Facilities Located Within 10-20 Minutes of the Subject Site

No.	Name	Distance	Walk	Cycle	Drive
1	Nurture Childcare and Early Learning	1.6km	21	9	3
2	Rèalta Draìochta Preschool	1.3km	17	6	2
3	Cuddles Early Years Service	1.6km	20	7	4
4	Woodhaven Montessori & Childcare Academy	1.6km	20	7	4
5	Woodstock Montessori & Preschool	2.0km	26	7	3

Figure 13.3: Location of Childcare Facilities in Relation to the Site

The study area is also served by 11 primary schools and 5 post-primary schools, the details of which are provided in Table 13.11 and identified on Figure 13.4.

Table 13.11: Existing Primary and Secondary Schools Located Within 5km of the Site

School Type	Name	Distance from Site	Enrolment Figures 2021/2022
Primary	Ennis National School	2km	631
Primary	Holy Family Senior National School	2km	307
Primary	Scoil Chriost Ri	1.7km	
Primary	Bunscoil na mBraithre	2.7km	655
Primary	Holy Family Junior School	2.4km	153
Primary	Ennis Educate Together National School	6.4km	80
Primary	St. Clare's School	3.5km	
Primary	St. Annes Special School	3.5km	
Primary	An Daingin National School	4.3km	
Primary	Gaelscoil Mhíchíl Cíosóg	3.6km	
Post-Primary	Gaelcholaiste an Chlair	1.8km	
Post-Primary	Ennis Community College	1.9km	
Post-Primary	St. Flannan's College	2.2km	
Post-Primary	Rice College	2.6km	

Table 13.12: Travel Times to the Primary Schools

Primary School	Distance from Site	Walk	Cycle	Drive
Ennis National School	2km	23	8	4
Holy Family Senior National School	2km	27	9	5
Scoil Chriost Ri	1.7km	21	6	3
Bunscoil na mBraithre	2.7km	34	11	5
Holy Family Junior School	2.4km	28	10	6
Ennis Educate Together National School	6.4km	47	14	9
St. Clare's School	3.5km	44	13	6
St. Annes Special School	3.5km	44	13	7
An Daingin National School	4.3km	54	16	7
Gaelscoil Mhíchíl Cíosóg	3.6km	44	12	5

Table 13.13: Travel Times to the Post-Primary Schools

Post-Primary School	Distance from Site	Walk	Cycle	Drive
Gaelcholaiste an Chlair	1.8km	24	7	3
Ennis Community College	1.9km	24	7	3
St. Flannan's College	2.2km	27	10	4
Rice College	2.6km	32	10	5

Figure 13.4: Location of Primary and Post-Primary schools in Relation to the Site

13.3.3 Local Amenity

Ennis Town Centre is located less than 2 km from the proposed development. The site is located to the west of Ennis Town Centre in the immediate context of the Ennis Golf Course to the east and within walking distance to a variety of commercial, recreational and community facilities including local shops, churches and schools.

13.3.4 Economic Activity

Owners and employees of other commercial activities may be impacted by the proposed development i.e. local business owners, industries, and farms in the vicinity. Consideration is given under economic activity to the potential impact on other commercial activities.

13.3.5 Temporary Receptors

In relation to temporary receptors, the proposed development is adjacent to the N28 and Carr's Hill Interchange located to the west. Due to the topography of the EIAR study area as well as the notable vegetation and trees along its boundaries, much of the site is screened from view. The site is visible in some long-distance views, including that from the opposite side of the city. Where visible it is considered that there will be an impact on drivers passing the site. Potential impacts are assessed in Chapter 4 Landscape and Visual Impact Assessment.

13.3.6 Do Nothing Scenario

If the development were not to proceed there would be no immediate impact on the existing population, or economic activity for residents living in the area. However, it would also prevent the development of a greenfield site which will be a catalyst for development within proximity to Ennis town. This would have a very significant negative long-term impact on both Ennis town centre and the projected population targets of both the National Planning Framework and Clare County Development Plan.
This development will facilitate an appropriate, sustainable settlement pattern which will accommodate residential, community, leisure and recreational facilities to satisfactorily match the level of population growth and household generation envisaged by the NPF 2040.

The land would likely remain vacant, with occasional agricultural use. The impacts on the land use are therefore envisaged to be a neutral 'do nothing scenario'.

13.4 Predicted Impacts

The following section outlines the evaluation of potential impacts under the following headings:

- Construction Phase
- Population and Settlement Patterns
- Economic Activity
- Land Use and Amenity
- Health
- Risk of Major Accidents and Disaster
- Cumulative Impacts

13.4.1 Construction Phase

The potential impacts arising during the construction phase relate to quality of life including visual, amenity, noise, ai quality and transport. Where relevant, these impacts have been considered in the relevant chapters of the EIAR and will be minimized or mitigated where appropriate. It is unlikely that these impacts have been considered in the relevant chapters of the EIAR and will be minimised or mitigated where appropriate. It is unlikely that these impacts will be of a scale to either encourage people to move from the area or discourage people from moving to the area.

A key characteristic of the proposed development relates to its potential economic impact. The construction phase will generate increased employment and capital spend on materials and services, which will benefit the local economy. In addition to direct employment, there will be substantial off-site employment and economic activity associated with the supply of construction materials and the provision of services such as professional firms supplying financial, architectural, engineering, legal and a range of other professional services to the project.

The impact of the construction phase will at least extend to the county in terms of the requirement for labour, goods and services. The effect will be significant, positive, and short-term.

13.4.1.1 Population and Settlement Patterns

The construction phase of the project will be short term and is not likely to result in any changes to the population and settlement patterns as described in Section 13.2.

13.4.1.2 Economic Activity

The construction phase of the development is anticipated to result in a temporary boost to the local economy as workers employed at the site can be expected to make use of local retail facilities and other services. If the application is successful, construction works will continue until the final phase of the development is completed by the end of 2024. Approximately 120 workers will be employed on site for up to 5 years, and there will be indirect benefits to other industries as a result of demand for construction materials and services. The loss of the agricultural lands is anticipated to have a neutral effect as the lands were under the ownership of the applicant.

Owners and employees of other commercial activities may be impacted by the proposed development i.e. local business owners, industries, and adjacent farms. Consideration is given under economic activity to the potential impact on other commercial activities.

13.4.1.3 Land Use and Amenity

The proposed development will increase the density of the current land use zoning objective and utilize a current vacant greenfield site in close proximity to Ennis Town Centre. In general, construction phase impacts on local amenity and receptors identified in proximity will be mainly related to noise, air quality and traffic. These are dealt with in the specific chapters of the EIA.

The construction works may result in a short term negative/neutral impact on the following receptors identified in Section 14.3.1;

- Temporary Receptors
- Several detached dwellings located along Circular Road
- Ennis Golf Course bounding the site to the North East

Potential impacts will mainly relate to noise from the construction, plant, traffic and the perception of visual changes associated with the removal of trees and hedgerows and emerging plant and machinery.

The assessment of potential impacts of noise and vibration is presented in Chapter 10 Noise and Vibration. No impacts from vibration are anticipated. The assessment identified that during construction the chief source of noise emissions will be from plant used onsite.

The assessment of potential visual impacts (Chapter 4 Landscape and Visual Impact Assessment) concluded that some negative landscape and visual effects during construction will be experienced in the vicinity of the development site, from locations with open or partial views of the proposed development site and along the roads where the construction traffic will travel. Impacts will range from not significant to slight adverse in the wider study area. The proposed residential development will impact on the existing landscape features with some low landscape value hedge removal and excavations for the roads and buildings. It is proposed to retain particularly ecologically valuable sections of hedgerow and incorporate these into the landscape design of the open space areas.

Potential Impacts from construction traffic are considered in Chapter 5 Material Assets: Traffic and Transport. A Construction Traffic Management Plan will be prepared to avoid impacts by restricting the majority of HGV's movements to local roads at off peak times, with an assumption that 20% of construction traffic, including truck movements and deliveries will occur during peak time. It is estimated that truck movements and general deliveries would arrive/leave at a steady rate during the course of the day.

In general, the impact of construction traffic is assessed as moderate negative, but short term and will be sufficiently accommodated on the local highway network in the vicinity.

13.4.1.4 Health

As with any construction site, there will be potential risks to the health and safety in terms of injury or death of construction personnel on-site due to the usage of large, mobile machinery as well as heavy equipment and materials. Proposed mitigation measures are outlined in the Construction and Environmental Management Plan, and also in Chapter 10 Noise and Vibration to manage construction activities and traffic movements as well as limiting noise and disturbance.

During construction, it is estimated that there will be up to 60 workers active on site per day. Assuming that these workers travel individually to the site by private car it is estimated that 120 vehicles per day anticipated to visit the site. There is an estimated maximum of 12 no. HGV vehicle movements per day which will be transporting construction material and cut and fill material to and from the site. The overall vehicle movements are estimated to be up to 132 per day. Total excavation and infill volumes of 20,000m3 respectively.

The Air quality assessment (Chapter 11) identifies that the greatest potential impact on air quality during the construction phase is from construction dust emissions and the potential for nuisance dust, with potential for significant dust soiling 50 m from the source. A number of mitigation measures are proposed and following implementation of these measures potential significant impacts are unlikely, and any effects will be negative, short-term and imperceptible with respect to human health.

The site will be made secure and the general public will be separated from the site by means of fencing and hoarding. All site facilities will be contained within the site area. The main entrance gate will be controlled by site personnel (gateman) for deliveries. Site lighting and a camera security system may be used to secure the site in out of hour times, and any proposed site lighting will be set up with consideration for adjoining properties.

A temporary construction compound will be established within the red line boundary, at the south-east corner of the proposed development site.

Following implementation of these measures the construction phase of the project adverse effects will be unlikely, neutral and short term.

13.4.2 Risk of Major Accidents and Disasters

The potential of major risks and disasters as a result of the proposed development has been assessed by other disciplines within this EIAR. No risk of major accidents and disasters has been identified. The project comprises development of a residential estate, in a greenfield area at the periphery of a suburban area. There are no sites in proximity which are subject to The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015. A Flood Risk Assessment (FRA) has been prepared and is included with the application as a standalone report. The FRA concluded that the proposed development is located in Flood Zone C, and the site is not at risk of flooding as a result of the proposed development. There is also no risk of increased flooding further downstream. Appropriate SuDS measures will ensure there is no increase in surface runoff from the proposed development as all rainfall will be attenuated to the greenfield run off.

13.4.3 Cumulative

There are a number of permitted and proposed developments in the vicinity of the EIAR study area which in combination with the proposed development may have cumulative impacts. The cumulative

impacts related to the following projects have been considered where relevant, in the context of the human environment:

Table 13.14: Cumulative Impacts

Proposal/Application	Planning Reference	Comment
Part 8 Housing Scheme 11 no. residential housing units at Uplands, Fermoy	Cork County Council Part 8 Application	Information at: https://www.corkcoco.ie/en/Planning/Part-8-Development-Consultation/active-part-8-development-consultation
Retention for Internal woks for new technology room, sanitary rooms, 3 no. new classrooms, 1 no. new computer room at St. Colman's College, Monumental Hill, Fermoy	Planning Ref: 21/4049	Permitted on 15th July 2021
A) the change of use (through intensification of use) of part of an existing light industrial building currently used for the assembly and commissioning of stainless-steel vessels to provide for an electropolishing area within the building footprint; b) internal works to facilitate the change of use, including the provision of an underground containment pit and other alterations to the factory floor; and c) ancillary external site works to connect to the existing on-site sewer network.	Planning Ref: 20/6246	Permitted by 07/12/2020
The demolition of 2 No. dwelling houses and associated sheds/outhouses and the construction of 28 No. residential units and all ancillary site development works, including access, car/bike parking, bin storage and amenity areas	Planning Reference: 21/7241	Under review by Cork County Council
To demolish existing pump canopy, shop and stores, for construction of valeting buildings, car wash, boundary fencing and 2 no. signs together with associated works.	Planning Reference: 19/6221	Permitted by 11/6/2020

13.5 Mitigation Measures

No likely negative impacts have been identified for population, or land use, accordingly no mitigation measures are required.

The proposed development has been designed to avoid negative impacts in relation to local amenities and recreational facilities by:

- Incorporating the provision of a creche within the design proposal
- Incorporating amenity facilities within the layout, including various park/parklet areas, play areas and provision for walking and cycling throughout the development

Accordingly, no further mitigation measures are required.

Potential Negative Impacts have been identified relating to the Health and Safety during the construction process, mitigation measures are proposed in Section 14.5. No significant risks to Human

Health have been identified within this discipline in relation to the operational phase of the development. Accordingly, no further mitigation measures are required.

13.5.1 Health and Safety Mitigation

In relation to the pre-construction and construction phases, health and safety risks will be managed in accordance with the Safety, Health, and Welfare at Work (Construction) Regulations, 2013. Measures are also set out in the CEMP, and include;

- Securing of site boundary and erecting of fencing or hoarding as required
- Minimising disruption of services through adequate engagement with utility and service providers;
- Restriction of construction working hours and traffic access;
- Personnel, pedestrian and vehicle segregation;
- Preparation of a site-specific Safety Statement;
- Preparation of an Emergency and Evacuation Plan.

The design of the proposed development will be subject to safety design reviews to ensure that all requirements of the project are safe. A Project Supervisor for the Design Process (PSDP) will be appointed as part of this process. Where issues are identified, corrective actions will be implemented to amend design issues prior to the issuance of final design for construction.

13.5.2 Construction Phase Mitigation

During the construction phase, safety will be a primary concern. A Project Supervisor for the Construction Process (PSCP), will be appointed to oversee site safety. A contractor safety management programme will be implemented identifying potential hazards associated with the proposed works. Temporary contractor facilities and areas under construction will be fenced off from the public with adequate warning signs of the risks associated with entry to these facilities. Entry to these areas will be restricted and they will be kept secure when construction is not taking place. Measures to ensure public safety, with respect to construction traffic will be included in the final Traffic Management Plan, to be agreed with the Planning Authority prior to commencement of development.

13.5.3 Operational Phase Mitigation

Measures to avoid potential negative impacts on population and human health have been fully considered in the design of the project and are integrated into the final layout and design. Compliance with the layout and design will be a condition of the permitted development. As such no mitigation measures are required.

13.6 Residual Impacts

It is anticipated that the proposed development will realise significant positive overall economic and social benefits for the local community and the wider Ennis area. Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual Impacts or effects on Population and Human Health from the construction and operation of the proposed scheme. Indeed, the delivery of much needed housing will realise a likely significant positive effect for the local area.

13.7 Monitoring

No specific monitoring is proposed. In general, monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission. Monitoring of compliance with Health & Safety requirements will be undertaken by the Project Supervisor for the Construction Process (PSCP).

13.8 References

13.8.1 Documents

Clare County Development Plan 2017-2023 and Clare Draft County Development Plan 2023-2029

The Provision of Schools and the Planning System - A Code of Practice for Planning Authorities (2008), The Department of Education and Science, and the Department of the Environment, Heritage and Local Government

13.8.2 Websites

Health and Safety Authority website - http://www.hsa.ie/eng/Topics/Hazards/ (Accessed 31/01/2022).

Central Statistics Office (CSO) website www.cso.ie (Accessed 29/01/2022).

Department of Education and Sciences (DES) website www.education.ie (Accessed 29/01/2022).

Tusla website www.tusla.ie/ (Accessed 30/01/2022).

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

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CHAPTER 14

Interactions of the Foregoing

August 2022

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14 Interactions of the Foregoing

14.1 Introduction

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter describes the potentially significant interactions of impacts identified in the previous chapters.

The potential cumulative effects of the proposed project in combination with other permitted developments in proximity has been considered in each chapter as relevant.

14.1.1 Author Information and Competency

This chapter was prepared by Majella O'Callaghan (MSc in Urban and Regional Planning, Dip in Project Management and BA (Hons) in Geography and Economics) of McCutcheon Halley Planning Consultancy. She holds qualifications in planning and is a Corporate Member of the Irish Planning Institute (IPI). She has worked with multi-disciplinary teams on several projects and has provided input to a variety of development projects that require both environmental and ecological assessment of potential impacts.

This chapter was also assisted by Aoife Browne (BSc Arts of Geography and Sociology and MPlan Planning and Sustainable Development) of McCutcheon Halley Planning Consultancy. She holds qualifications in planning and is a Member of the IPI.

14.1.2 Assessment Methodology

14.1.2.1 Legislative Requirements

The EIAR has considered and assessed the interactive effects and cumulative impacts arising from the construction and operation of the proposed development based on best scientific knowledge. Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Article 3 (1) of the amended EIA Directive;

> *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
>
> *(a) population and human health;*
>
> *(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
>
> *(c) land, soil, water, air and climate;*
>
> *(d) material assets, cultural heritage and the landscape;*
>
> *(e) the interaction between the factors referred to in points (a) to (d)."*

Annex IV of the amended Directive states that a description of impacts should include:

> *"…the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project"*

The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 14.1.

14.2 Description of Significant Interactions

14.2.1 Landscape and Visual Impact

Chapter 4 assesses the likely impacts on landscape, and the visual impacts arising from the proposed development. During the construction phase, the following aspects would interact with Landscape and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Potential effects to visual amenity within the locality or the wider study area as a result of the visibility of construction activities such as demolition works, the construction / restoration of buildings, associated scaffolding, site traffic and construction compounds.
- **Soils and Geology:** Removal of soils will cause a change to the existing landscaping which will have a negative impact on local receptors in particular; however the effects will be short term for the construction phase. The reuse of soils as fill material also has a potential for impacts.

During operation the potential interactions are:

- **Population and Human Health:** Potential effects of the development on views and visual amenity such as the potential for the development to alter (beneficial or adverse) the composition of the view from a viewpoint.

The potential significant impacts of Landscape have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.2 Material Assets – Traffic and Transport

Chapter 5 assesses the likely impacts on Traffic and Transportation arising from the proposed development. During the construction phase, the following aspects would interact with Traffic and Transport and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Construction traffic has the potential to negatively impact local residents and businesses through increased delays and potential impacts on health and safety.
- **Noise and Vibration:** Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents.
- **Air Quality and Climate:** Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.
- **Water (Hydrology):** Construction vehicles at this site may give rise to hydrocarbon spills.

During operation the potential interactions are:

- **Population and Human Health:** Increased traffic once each phase of the development is occupied has the potential to negatively impact local residents and businesses through increased delays and potential impacts on health and safety.
- **Noise and Vibration:** Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents.
- **Air Quality and Climate:** Emissions from traffic may result in a decrease in local air quality, increased greenhouse gas emissions and emission from traffic may contribute to climate change.
- **Water (Hydrology):** Increased traffic and parking at the site may give rise to hydrocarbon spills from vehicle.

The potential significant impacts of Traffic and Transport have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan and the Construction Traffic Management Plan proposes a series of measures to mitigate the impact of construction traffic. For the operational phase, the development has been designed to promote active modes of travel. The surface water layout has also been designed with

use of hydrocarbon interceptors as appropriate. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.3 Material Assets: Services and Infrastructure

Chapter 6 assess the likely impacts on Services and Infrastructure arising from the proposed development. During the construction phase, the following aspects would interact with Services and Infrastructure and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** there may be interruptions to existing services, including water, electricity, communications, as connections are provided between the proposed development and existing services.
- **Water (Hydrology):** works to provide connections to utilities and services, such as foul and surface water, sewer may have negative impacts on groundwater if spills or fuels or other contaminants occur. Stockpiling of materials or works may lead to temporary localized flooding if the drains become blocked.

During operation, the potential interactions are:

- **Water (Hydrology):** There will also be an increased demand on potable water on the municipal drainage infrastructure**.**
- **Biodiversity:** Disturbance to bats arising from artificial light spillage into the environment form the associated lighting scheme

The potential significant impacts to Services and Infrastructure have been considered within the relevant discipline and mitigation measures outlined where required. The Construction Environmental Management Plan will put in place measures to mitigate interruptions to services and utilities during the construction process. Irish Water have advised there is sufficient capacity of potable water to serve the proposed development. The lighting scheme has been designed to limit artificial lighting in areas where bats may be present. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.4 Land

Chapter 7 assesses the likely impacts on Land, Soils and Geology arising from the proposed development. During the construction phase, the following aspects would interact with Land, Soils and Geology and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human health:** Site clearance and demolition has the potential to result in increased dust and particulate emissions to air as well as the potential to release contaminated soils to the local environment.
- **Water (Hydrology):** Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result subsoil erosion and generation of sediment laden surface water runoff.
- **Biodiversity**: removal of the existing topsoil layer will be required across the site as well as removal of some trees and hedgerows.
- **Cultural Heritage and Archaeology:** There may be an impact to Cultural Heritage and Archaeology if previously undiscovered sub-surface remains are damaged or destroyed during site clearance and/or construction.
- **Traffic and Transportation:** Delivery of materials to site will lead to potential impact on the surrounding road network.
- **Noise and Vibration:** Development of the site will result in a level of construction related noise and vibration on sensitive receptors

There are considered to be no potential significant interaction of impacts with Land during the operational phase of the development.

Overall, the potential significant impacts to Land, Soils and Geology have been considered within the relevant discipline and mitigation measures outlined where required. The Construction Environmental Management Plan will put in place measure to mitigate negative impacts during site clearance and demolition works, and to avoid contaminated run-off to surface water. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.5 Water (Hydrology)

Chapter 8 assesses the likely impacts on Water (Hydrology) arising from the proposed development. During the construction phase, the following aspects would interact with Water (Hydrology) and in the absence of mitigation may give rise to likely significant effects. During Construction the potential impacts to the underlying groundwater aquifer from the proposed works could derive from accidental spillages of fuels, which could impact on groundwater quality, if allowed to infiltrate to groundwater.

- **Biodiversity:** any negative impacts on water quality such as increased discharge of silt or sediment to surface water may result in impacts to biodiversity downstream of the site.

The potential significant impacts to Water (Hydrology and Hydrogeology) have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will put in place measure to ensure that there is no increased discharge of silt or sediment to surface water. The Flood Risk Assessment has taken account of the projected effects of climate change and the development is designed to be outside of any flood risk associated with climate change effects. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.6 Biodiversity

Chapter 9 assesses the likely impacts on Biodiversity arising from the proposed development. No other potential significant interactions have been identified other than those already described. The potential significant impacts to Biodiversity have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.7 Noise and Vibration

Chapter 10 assesses the likely impacts on Noise and Vibration arising from the proposed development. During the construction phase, the following aspects would interact with Noise and Vibration and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents.

During operation, the potential interactions are:

- **Population and Human Health**: Once the development is fully occupied increased levels of noise due to increased traffic and activity may result in negative impacts to the amenity of local residents.

No other potential significant interactions have been identified other than those already described. The potential significant impacts of Noise and Vibration have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will include measure to mitigate the impact of noise and vibration during construction activities. For the operational phase, the development has been designed to promote a high use of active modes of travel, mitigating potential impacts of increased traffic noise. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.8 Air Quality and Climate Change

Chapter 11 assesses the likely impacts on Air Quality and Climate Change arising from the proposed development. During the construction phase, the following aspects would interact with Air Quality and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Construction Activities may result in a decrease in local air quality which has the potential to negatively impact on human health.

No potential operational interactions were identified, and no other potential significant interactions have been identified other than those already described. The potential significant impacts to Air Quality have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will include measure to mitigate the impact on air and climate during construction activities. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.9 Cultural Heritage and Archaeology

Chapter 12 assesses the likely impacts to Cultural Heritage and Archaeology arising from the proposed development. No other significant interactions have been identified, other than those discussed above. The potential significant impacts to Cultural Heritage and Archaeology have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.10 Population and Human Health

Chapter 13 assesses the likely impacts to Population and Human Health arising from the proposed development. No other significant interactions have been identified, other than those discussed above. The potential significant impacts to Population and Human Health have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

14.2.11 Major Accidents & Disasters

Chapter 16 assesses the Risks of Major Accidents and Disasters arising from the proposed development. No other significant interactions have been identified other than those discussed in this chapter. With mitigation measures in place, no significant residual negative impacts are predicted.

Table 14.1: Potential Interaction Effects Matrix (Con= Construction, Op=Operational. If there is considered to be no potential for an effect, the box is left blank.

Interaction	Landscape		Material Assets – Traffic & Transport		Material Assets – Infrastructure		Land & Soils		Water		Biodiversity		Noise & Vibration		Air Quality & Climate		Cultural Heritage		Population & Human Health	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Landscape							X												X	X
Traffic & Transport									X	X			X	X	X	X			X	X
Infrastructure									X	X		X							X	
Land			X						X		X		X				X		X	
Water											X									
Biodiversity																				
Noise & Vibration																			X	X
Air Quality & Climate																			X	X
Cultural Heritage																				
Population & Human Health																				
Major Accidents																				

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CHAPTER 15

Summary of Mitigation and Monitoring

August 2022

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15 Summary of Mitigation and Monitoring

15.1 Introduction

This chapter includes the full schedule of mitigation measures and monitoring where proposed in respect of the Strategic Housing Development at Ballymacaula, Drumbiggle, Circular Road, Ennis, Co. Clare.

15.1.1 Mitigation

The draft EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017) identifies that there are 4 established strategies for the mitigation of effects; avoidance, prevention, reduction, and offsetting.

Mitigation By Avoidance: Avoidance usually refers to strategic issues, such as site selection, site configuration or selection of process technology. This may be the fastest, cheapest, and most effective form of effect mitigation. In some cases, mitigation by avoidance may also be considered as part of the "consideration of alternatives".

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. This is regarded as a less sustainable, though still effective, approach, implemented through reducing the effect and/or reducing exposure to the effects.

Mitigation by Remedy/Offsetting: This is a strategy used for dealing with adverse effects which cannot be prevented or reduced. Remedy is compensating for or counteracting adverse effects. Examples include increased planting of specific trees/shrubs to replace unavoidable loss of vegetation, or provision of a new amenity area to compensate for the unavoidable loss of access to the grounds of an old house. Examples of Offsetting include reinstating buildings, walls or features, or the introduction of tunnels to enable wildlife to access other comparable habitats.

15.1.2 Monitoring

Some disciplines have proposed monitoring following their assessment of impacts and implementation of proposed mitigation measures. Monitoring will take place after consent is granted in order to demonstrate that the project in practice conforms to the predictions made during the EIA process. Monitoring provides assurance that proposed systems are operating as intended. This allows adjustments of operations to be made to ensure continued compliance with consent conditions such as emission limit values, conditions of operation, performance criteria/ indicators and detection of unexpected mitigation failures.

The EPA Guidelines also state that "It is particularly important that the developer understands their commitment to mitigation measures that are proposed in an EIS. These are enforceable undertakings that will have to be put in place and sustained when the project is implemented".

The following mitigation and monitoring measures set out in Table 15.1 have been proposed by the specialist consultants during preparation of the EIAR.

Table 15.1: Mitigation and Monitoring Table

Potential Impact	Construction	Operation
EIAR Topic: Chapter 2 Project Description		
Potential impacts during construction and operation	Chapter 2 describes the project and includes construction stage controls and mitigation measures as out in the OCMP, and demolition and construction waste management plans. It will be a requirement that all personnel will understand and implement the final agreed CMP. Traffic management and management of vehicle movements to minimise disruption protect staff and residents are proposed, including segregation of pedestrian and vehicle routes. Construction health and safety measures are proposed to ensure the safety of people involved in and affected by the development. This includes pedestrians, road users, neighbours, site staff and visitors to site. Some of the site-specific issues that will have to be addressed during the construction of the proposed development include: ▪ Dealing with noise mitigation along the N85 national road ▪ Managing the topography of the land ▪ Identifying, storing and handling of hazardous and contaminated materials ▪ Protecting existing roadways against damage, in particular in areas where excavations and retaining structures are proposed adjacent to roadways. ▪ Identifying, diverting, maintaining and connecting to existing live services. ▪ Managing vehicular and pedestrian traffic on the surrounding roadways for the duration of the construction works. ▪ Managing crane movements to limit lifting over live buildings and roadways. Construction operations on site are proposed to be between the hours of 08:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 8:00 and 18:00, Monday to Friday. The construction shift times will ensure construction traffic will have limited impact on the peak periods of 07:30-08:30 in the morning and 17:15-18:15 in the evening as it is envisaged most construction staff will arrive to work before 8:00 in the morning and leave after 18:00 in the evening. A Construction Traffic Management Plan (CTMP) will be developed by the Contractor and presented to CCC for approval prior to commencement of the construction works. Environmental management measures to prevent environmental impacts are proposed, including the following; ▪ Protection of surface waters prior to commencement of earthworks. ▪ Material handling and storage ▪ Fuel storage tanks ▪ Spill Control Measures ▪ Foul Drainage ▪ Emergency fire and accident procedures ▪ Surface water management during construction including use of silt fencing;	Management of potential surface water impacts are included in the drainage design (these are also identified in the Site Infrastructure Report and in Chapter 9 Biodiversity). ▪ Where possible external levels will be designed to encourage surface water runoff towards soft landscaping features to reduce peak runoffs, provide additional attenuation and improve water quality. ▪ Discharge off site will be restricted to limits as outlined in the CSDLS and attenuation/tidal holding will be provided on site in the form of buried geocellular crates and/or concrete tanks. ▪ Trapped gullies/catchpits will be provided as required and an appropriate maintenance regime put in place to prevent excessive runoff of silt from the site. Where required (e.g. from car park areas) surface water will be pass through a hydrocarbon interceptor prior to discharge offsite. ▪ Sustainable Drainage (SUDS) measures will be incorporated where possible to promote sustainable development. These may include blue/green roofs, permeable paving and promotion of overland flow into landscaping features.

Potential Impact	Construction	Operation
	▪ Waste management and waste minimisation ▪ Management and disposal of materials and of potentially contaminated materials removed during earthworks, or demolition. ▪ Sensitive location of construction site compound and staff facilities A Noise and Vibration Management Plan (NVMP) will be formulated for the demolition and construction phase of the project. The main contractor is required to follow and implement where required, the procedures set out in the NVMP. Where required, appropriate mitigation measures shall be implemented to minimise significant impacts at receptor locations. A noise monitoring programme will be implemented on site for the duration of the construction works. Noise monitors shall be maintained and operated as per the methods set out in the NVMP. Dust mitigation measures are proposed. These are also referred to in Chapter 11 Air Quality and in the Dust Minimisation Plan included as Appendix 11.2.	
EIAR Topic: Chapter 3 Alternatives Considered		
Potential impacts have been mitigated by design, as set out in Chapter 2	Alternatives may be described at six levels: do-nothing alternative, alternative locations, alternative layouts, alternative design, alternative processes and alternative mitigation measures. The consideration of the main alternatives in respect of the development of the subject land was undertaken by the Design Team. The proposed final strategy is the most appropriate scheme with the least environmental effects, and therefore no mitigation measures are required.	All potential mitigation measures relating to alternative layout and design have been incorporated in the final agreed design of the project, and therefore there is no requirement to provide operational mitigation measures.
EIAR Topic: Chapter 4 Landscape and Visual Impact		
Potential impacts have been mitigated by Design, as set out in Chapter 2 and Chapter 3.	During construction works, measures such as site hoardings and cleaning roads to remove any track out will be undertaken to reduce temporary effects on visual amenity.	The principal mitigation for the Proposed Development is inherent in the design of its architecture, landscaping, public realm, and open space, which has evolved through an iterative process of assessment and consultation. There are no operational management measures required in respect of landscape and visual issues.
EIAR Topic: Chapter 5 Material Assets: Traffic and Transportation		
Increased traffic during both construction and operational phases	▪ Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and residents to a minimum. ▪ To minimize disruption to the local areas, construction traffic volumes will be managed through the following measures: ▪ During peak hours, ancillary, maintenance and other site vehicular movements will be discouraged; ▪ Daily construction programmes will be planned to minimize the number of disruptions to surrounding streets by staggering HGV movements to avoid site queues; and ▪ The contractor will be required to promote travel by sustainable modes of transport.	▪ An Outline Mobility Management Plan for the residents of the proposed development has been prepared and is presented in Appendix 5.1. ▪ This document sets mode split targets for residents at the proposed development and sets out initiatives proposed in order to encourage travel by sustainable modes and meet the targets set.

Potential Impact	Construction	Operation
	▪ Construction operations on site are proposed to be between the hours of 08:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 08:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. ▪ The construction shift times will ensure construction traffic will have limited impact on the peak periods of 07:30-08:30 in the morning and 17:15-18:15 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening. ▪ Due to the specific nature of some construction activities, or to mitigate disruption to the local environment, there may be a requirement for working outside these hours. Should this be required, it will be by agreement with Clare County Council. ▪ A Construction Traffic Management Plan (CTMP) will be developed by the Contractor and presented to Clare County Council for approval prior to commencement of the construction works. The CTMP will contain detailed temporary traffic management drawings for each construction stage and will include the mitigation measures described in this section. ▪ The contractor will be required as part of the contract to introduce a mobility management plan for its workforce to encourage access to the site by means other than by private car. The following identifies some of the measures the contractor will provide as part of the Mobility Management Plan. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with Clare County Council prior to works beginning on site. ▪ **Walking**: The pedestrian environment surrounding the site is considered to be good with footpaths provided along all roads. Good pedestrian routes exist between the site and nearby bus stops. ▪ **Cycling**: Cycle parking spaces and associated showers and lockers will be provided on the site for construction staff. ▪ **Car Sharing:** Car sharing among construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor shall aim to organise shifts in accordance with staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the site car parking facility and will minimise the potential traffic impact on the road network surrounding this facility. ▪ **Public Transport**: The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the various public transport services in the vicinity of the construction site, including bus routes that operate in the vicinity of the site. The Contractor	

Potential Impact	Construction	Operation
	will also offer the "Travel to Work Scheme" to employees.	
EIAR Topic: Chapter 6: Material Assets: Services, Infrastructure and Utilities		
Potential impacts to services	▪ The contractor will be obliged to put temporary measures in place to limit the rate of surface runoff from the site. They will also be obliged to manage the quality of surface water runoff and ensure run-off from the site does not result in excessive siltation of the receiving drainage channels. This will be managed in line with the Outline Construction Management Plan. ▪ The contractor is expected to agree a dedicated water supply connection and a wastewater discharge connection for the construction activities. It is expected they will consult Irish Water to obtain these connections. ▪ The Contractor will be obliged to put measures in place to ensure that there are minimal or no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority. ▪ All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have. Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements.	▪ Due to the measures already incorporated in the design no additional mitigation measures will be necessary on surface water during the operational phase. ▪ Connection agreements will be made with Irish Water regarding water supply to the site and foul water discharge off site. No additional mitigation measures will be required. Irish Water have been consulted and confirmed capacity within their networks to serve the site ▪ As the utility operators predominately upgrade their networks in anticipation of future opportunities, it is anticipated surrounding businesses and residents are likely to benefit from the upgrade of utilities without any requirement for long-term mitigation measures. ▪ As noted previously, this will positively impact the local community with strengthening of the existing utilities in the locality although there may be slight short-term negative impacts such as local outages as the utilities tie into these existing networks.
Monitoring	▪ Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development and close contact with the electricity, gas and water utility providers will be under the control of the main contractor. ▪ All utilities will be monitored and metered in accordance with service agreements for the various utilities. ▪ Appropriate maintenance regimes will be put in place to monitor and maintain surface water drainage.	▪ All utilities will be monitored and metered in accordance with the service agreements for the various utilities. ▪ Appropriate maintenance regimes will be put in place to monitor/maintain surface water drainage. This will include periodic cleaning out of gully pots & drainage channel sumps and cleaning of pipes if/when blockages occur. Hydrocarbon interceptors will be fitted with sensors/alarms designed to notify the site maintenance team when hydrocarbon levels are such that the unit needs to be emptied.
EIAR Topic: Chapter 7: Geology, Land and Soils		
Contaminated Dust/Asbestos	▪ During construction, the potential risk to site users and member of the public from contaminated dust will be managed using standard health and safety measures as outlined in the Health and Safety Authority guidance document on working with asbestos (HSA 2013). ▪ Control measures for the construction stage will be devised based on a risk assessment carried out by the contractor prior to the development and will be specific to the construction methods.	None Proposed
Contaminated soils	▪ Only suitably experienced contractors shall be used to carry out the remediation work. During construction, they shall employ standard practices	None Proposed

Potential Impact	Construction	Operation
	to manage risk form contaminated soils and ground gas. These will be designed by the contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls.	
Monitoring	▪ During construction, the contractor will develop a CEMP. This will outline the methods of monitoring and frequency. ▪ It is a mandatory requirement by the HSA to implement an air monitoring program by an independent analyst for the removal of the asbestos in soil. The contractor who carries this out will be required to ensure that the control measures do not release airborne asbestos fibres.	None Proposed
EIAR Topic: Chapter 8 Hydrology and Hydrogeology		
Emissions of dust and sediment runoff; **Spill control measures to protect soil and groundwater**	▪ When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from flowing water or water that may enter the watercourses bounding the site for a period sufficient to ensure no leachate from the concrete. ▪ Weather conditions will be taken into consideration when planning construction activities to minimise risk of run-off from site. Topsoil and subsoil will not be mixed. ▪ Measures to prevent the release of sediment, will include (but not limited to) use of the use of silt fences, silt curtains, settlement lagoons, and filter materials. ▪ All hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. ▪ Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction. ▪ Mobile plant will be refuelled in a designated area, on an impermeable base away from drains or watercourses. ▪ Safe materials handling of all potentially hazardous materials will be implemented by all construction personnel employed.	None Proposed. For designed measures refer to mitigation measures under Chapter 2 Project Description.
Works to drainage system	As no significant effect has been identified no mitigation measure is required, however as good practice the following site-specific measures will be implemented: ▪ The main contractor will manage surface water during the replacement the open drainage. Where pipe culvert construction is proposed a temporary by-pass channels or other appropriate measures (i.e. pumping to downstream drainage) will be put in place to avoid obstruction of flow. ▪ Any surface ponding from rainfall events will be gathered locally to facilitate pumping with subsequent discharge, under licence, to the local sewerage drainage network. The OCMP will cover	

Potential Impact	Construction	Operation
	all potentially polluting activities from this process and include an emergency response procedure. ▪ Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.	
Monitoring	▪ Earthworks will be undertaken in accordance with OCMP and will be monitored by a Resident Engineer to ensure they conform to the methodology outlined in the OCMP.	▪ Monitoring of trapped gullies/catchpits will be included as part of the drainage strategy and an appropriate maintenance regime put in place to prevent excessive run-off of silt from the site.
EIAR Topic: Chapter 9 Biodiversity		
Potential impacts to Designated Nature Conservation Sites	Mitigation measures will be integrated as part of the proposed development regarding environmental protection of the following water-features in relation to potential construction and operational phase surface-water run-off impacts. Please refer to the NIS undertaken in support of the AA process that is provided as a standalone document accompanying the planning application.	
Potential impacts to Habitats and Flora	▪ No permanent removal/damage of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the development site works area/footprint will be clearly marked for associated site staff. ▪ Final landscape plan will incorporate a net gain of native and non-native pollinator friendly tree/shrub planting (in line with NBDC 2016) from the existing situation. In this case, Landscape Masterplan proposals include various native/non-native pollinator friendly tree planting proposals (see Landscape Design Masterplans LP-02-PP to LP-05-PP) Landscape Design Overall Planting Proposal PP-01-PP). ▪ Existing trees/shrubs being retained will be protected in line with current guidelines (e.g. NRA 2006, BS 5837) and with reference to the Arboriculturist's Report where relevant (e.g. Arbor-Care 2020).	▪ Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (*e.g.* NBDC 2016): reduced grass/lawn mowing frequency, avoidance/reduction of pesticide/herbicide use within green areas etc. ▪
Potential impacts to Fauna: Birds, Non-volant Mammals, Bats, Other Taxa & Aquatic Species	▪ Subject to other environmental concerns (*e.g.* run-off management), the removal of woody vegetation (scrub, treeline, trees) during site clearance/construction phase will not be undertaken during the bird nesting season (currently defined by the Irish Wildlife Acts 1976 – 2012 as March 1st to August 31st inclusive); this will protect nesting birds and eggs/chicks from disturbance (especially through nest failure), injury, fatality. ▪ All trees due for felling will be assessed in advance by a suitably qualified/experienced Ecologist in accordance with best practice guidelines (*e.g.* BTHK 2018, Collins 2016), to identify tree specimens with potential to support bat roosts. All trees with potential to support bat roosts will be marked in the field to allow easy identification for all site staff and thereby ensure protection from inappropriate felling (e.g. erect a notice as per NRA 2005). The subsequent felling of all such trees to be undertaken under the advice/supervision of a suitably qualified/experienced Ecologist in	▪ The operational phase lighting scheme will be designed to minimise light spillage nuisance on areas of the study site that are considered sensitive to artificial lighting in relation to bats (*i.e.* existing trees/new tree planting areas at the study site or the adjoining area in general) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night. The proposed lighting scheme here will focus lighting on areas where it is needed as much as possible (roads, streets, footpaths) and minimise spillage onto relevant sensitive areas comprising of existing trees/new tree planting areas at the study site or the adjoining area in general (see Site Services Layouts Public Lighting Sheets 1 & 2 and Outdoor Lighting Report by Molloy Engineers accompanying the planning application) – in the event the proposed operational artificial lighting scheme will be changed, the revised scheme will also be reviewed

Potential Impact	Construction	Operation
	accordance with best practice guidelines (*e.g.* NRA 2005) and in consultation with NPWS where relevant (e.g. derogation licence to remove bat tree roost; see NRA 2005). ▪ Where a fauna species is found actively using the development footprint for breeding/resting (*e.g.* bird nest, bat roosting) during site clearance/construction phase, relevant works will cease immediately and the area will be cordoned off until advice is sought from a suitably qualified/experienced Ecologist. ▪ Where open excavations must be left in-situ overnight during the construction phase, measures will be taken to ensure that fauna such as mammals do not become inadvertently trapped and potentially injured within such open excavations. Such measures (covering, fencing off, allowing access/egress) will be decided under the advice of an Ecologist. ▪ Construction operations during the hours of darkness will be kept to a minimum; this will minimise disturbance to species that are roosting/resting or active at night. ▪ The construction phase lighting scheme will be designed to minimise light spillage nuisance on areas of the study site that are considered sensitive to artificial lighting in relation to bats (*i.e.* existing trees/new tree planting areas at the study site or the adjoining area in general) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night. ▪ The final landscape plan will incorporate a net gain of native and non-native pollinator friendly tree/shrub planting (in line with NBDC 2016) from the existing situation, and also ensure that new planting connects to woody habitat/other vegetation in order to maintain and provide connectivity for fauna via wildlife corridors. In this case, Landscape Masterplan proposals include various native/non-native pollinator friendly tree planting proposals ((see Landscape Design Masterplans LP-02-PP to LP-05-PP) Landscape Design Overall Planting Proposal PP-01-PP).	by an Ecologist/Bat Specialist and altered accordingly under their advice. ▪ The storm drainage system (including hydrocarbon interceptors *etc.*) will be inspected and properly maintained/serviced in line with industry standards and requirements on an on-going basis throughout its lifetime. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation downstream water-features in the wider area.
Monitoring	A suitably qualified/experienced Ecologist will be engaged in the role of Ecological Clerk of Works (ECoW) for the construction phase of the project, whose role will include the following monitoring in relation to relevant proposed mitigation measures (as outlined in Section 9.6) through liaising with relevant experts/team-members where required: ▪ Ensure that the development works area/footprint is clearly marked out with no removal of habitats or movement of construction machinery outside of this area. ▪ Review final landscaping plan to ensure it is in line with/equivalent to proposed mitigation regarding	The following operational stage monitoring will be undertaken in relation to relevant proposed mitigation measures (as outlined in Section 9.6) by engaging the relevant experts; ▪ Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing

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	native and non-native pollinator friendly tree/shrub planting and wildlife corridor connectivity. ▪ Ensure that retained trees/shrub are adequately protected. ▪ Ensure that invasive plants are appropriately managed/eradicated with a field assessment to determine the most up-to-date status of invasive plants relative to the works area. ▪ Ensure that woody vegetation (treeline/trees, scrub) removal is not undertaken during the bird breeding season. ▪ Ensure that a pre-felling/removal assessment of bat roosting potential/activity in relation to trees/buildings due for removal is undertaken, with subsequent protection and appropriate follow-up actions where required. ▪ Ensure that where a fauna species is found actively using the development footprint for breeding/resting (e.g. bird nest, bat roost) during site clearance/construction phase, relevant works are ceased immediately and that the area is cordoned off until appropriate follow-up actions are undertaken where required. ▪ Assess the potential for overnight open excavations to inadvertently trap mammals with appropriate follow-up actions where required. ▪ Review construction/operational phase lighting plan to ensure minimal light spillage nuisance on areas of the study site that are considered sensitive to artificial lighting in relation to bats (i.e. existing trees/new tree planting areas at the study site or the adjoining area in general).	frequency, avoidance/reduction of pesticide/herbicide use within green areas etc. ▪ The storm drainage system (including hydrocarbon interceptors etc.) will be inspected and properly maintained/serviced in line with industry standards and requirements on an on-going basis throughout its lifetime. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation downstream water-features in the wider area.
Natura Impact Statement (Standalone Report)		
Impacts to Natura 2000 sites.	The following construction related run-off controls are proposed as part of the development in question as follows (after Outline Construction Management Plan by Tobin Engineers); ▪ Specific measures to prevent the release of sediment over baseline conditions during the construction work, which will be implemented as the need arises. Tarpaulins or polythene sheets will be used to cover stockpiles of material during heavy rainfall to avoid sediment release. ▪ Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment.	Operational stage run-off proposals will be integrated into the development under consideration here that are summarised as follows (see Site Infrastructure Report by Tobin Engineers); ▪ Surface-water run-off collected from car parking areas will pass through Class 1 By-Pass hydrocarbon Interceptors prior to discharging into the network. Sump units will be integrated into all surface-water channel drains and road gullies to allow for the collection and removal of silt. ▪ External levels will be designed to allow surface-water run-off to discharge towards soft landscaping aspects where possible to reduce peak run-off, provide additional attenuation and improve water quality.

Potential Impact	Construction	Operation
	▪ Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence. ▪ Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site. Topsoil and subsoil will not be mixed together. ▪ Any fuels of chemicals (including hydrocarbons or any polluting chemicals) will be stored in a bunded area to prevent any seepage of into the local surface water network or groundwater. These will be designed in accordance with guidelines produced by CIRIA. ▪ All mobile fuel bowsers shall carry a skill kit and operatives will have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. ▪ All fuels and chemicals required to be stored on-site will be clearly marked. ▪ Implementation of response measures to potential pollution incidents. ▪ Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. ▪ All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points. ▪ Any seepage/infiltration and surface ponding from rainfall events will be gathered locally to facilitate pumping with subsequent discharge, under licence, to the local sewerage drainage network. The final CEMP will cover all potentially polluting activities from the dewatering process (should one be required for foundation and attenuation tank construction) and include an emergency response procedure. For example, prior to any discharge, the water will be passed through silt traps and hydrocarbon/oil interceptors within the construction site confines. This will result in the separation of sediment from the water prior to its discharge and will ensure that the water is of adequate quality before it enters the local authority drainage system. ▪ The use of silt traps and interceptors will be supplemented by proper housekeeping and control measures such as regular testing and monitoring of water quality to ensure compliance. ▪ When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from flowing water or water that may enter the watercourses bounding the site for a	▪ The storm drainage system (including hydrocarbon interceptors etc.) will be inspected and properly maintained/serviced in line with industry standards and requirements on an on-going basis throughout its lifetime. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk).

Potential Impact	Construction	Operation
	period sufficient to ensure no leachate from the concrete. ▪ All hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. ▪ Mobile plant will be refuelled in a designated area, on an impermeable base away from drains. ▪ Safe materials handling of all potentially hazardous materials will be implemented by all construction personnel employed. ▪ The pumping of groundwater may be required during excavation for foundation and attenuation tank construction, with the proposed locations of pump wells selected so as to minimise the volume of pumping. ▪ Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites. ▪ The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same. ▪ A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase. ▪ Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt). ▪ Groundwater level and quality monitoring during construction.	
EIAR Topic: Chapter 10 Noise and Vibration		
Impacts to receptors from noise during construction	▪ Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced. ▪ Queuing of trucks outside the site entrance will be prohibited. ▪ Machinery not in active use will be shut down. ▪ A site representative will be appointed as a liaison officer with the local community. ▪ Where evening or night-time operations are required, local residents will be notified through the liaison officer. ▪ All complaints of noise received during the construction phase will be logged in a register, and	▪ Operational phase mitigation required onsite relates solely to inward impacts associated with local road traffic and potential light rail noise. ▪ The chief onsite elements of concern are windows and ventilation openings, which represent the weakest link in building facades. A requirement to install acoustic grade windows at certain facades has been identified. A final decision on the glazing and ventilation requirements will be made during the detailed design stage.

Potential Impact	Construction	Operation
	investigated immediately. Details of follow-up action will be included in the register. ▪ Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance. ▪ Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile. ▪ Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.	
Vibration	▪ A Noise and Vibration Management Plan (NVMP) will be prepared in relation to the construction phase. The main contractor will be required to follow and implement the procedures set out in the NVMP.	None Proposed
Monitoring	▪ The NVMP will include a requirement to undertake noise monitoring in the vicinity of the site throughout the construction work, and the contractor will be required to maintain and operate noise monitoring terminals at relevant locations. Monitoring will ensure that noise levels will not exceed relevant construction noise criteria, or further limits if imposed by the Local Authority. ▪ Given the proximity of Pairc Ui Chaoimh to proposed onsite piling zones, it is recommended that vibration monitoring is undertaken at the stadium throughout periods of piling, subject to agreement with the Gaelic Athletic Association. The purpose of the monitoring will be to ensure that PPV levels do not exceed Table 10.2 criteria at the stadium complex. Monitoring should be carried out by reference to British Standard BS 5228-2:2009+A1:2014 and the Association of Noise Consultants document Measurement And Assessment of Groundborne Noise And Vibration (2012).	None Proposed
EIAR Topic: Chapter 11 Air Quality and Climate		
Emissions of dust and particulate matter	▪ The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the Dust Management Plan. ▪ The key aspects of controlling dust are listed below. Full details of the Dust Management Plan can be found in Appendix 11.2. These measures will be incorporated into the overall Construction Management Plan (CMP) for the site. In summary the measures which will be implemented will include: ▪ Prior to demolition blocks will be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	▪ The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site specific mitigation measures are required.

Potential Impact	Construction	Operation
	▪ During the demolition process, water suppression will be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction will be used. ▪ Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays will be employed. ▪ Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. ▪ Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions. ▪ Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads. ▪ Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates. ▪ Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. ▪ Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. ▪ During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions. ▪ At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.	
Monitoring	Monitoring is not proposed for the construction phase of the proposed development as impacts are predicted to be imperceptible. There is a low risk of dust soiling and human health impacts as a result of the construction phase. Once the dust mitigation measures outlined above and set out in Appendix 11.2 are implemented construction dust emissions will be insignificant	None Proposed
EIAR Topic: Chapter 12 Cultural Heritage and Archaeology		
Damage to unknown subsurface archaeological deposits	▪ Archaeological monitoring of ground excavation works during the construction phase will be carried out by a suitably qualified archaeologist, licensed by the National Monument Service, in accordance with Section 4.7.2.3 (Archaeological Monitoring) of the South Docks Local Area Plan (2008).	None Proposed

Potential Impact	Construction	Operation
	▪ In the event that any archaeological remains are identified they will be recorded and left to remain securely in situ while the National Monuments Service and Cork City Council are consulted to determine further appropriate mitigation measures, which may entail preservation in situ by avoidance or preservation in record by archaeological excavation. ▪ A report comprising a photographic and written record of the existing modern buildings within the proposed development site will be compiled prior to their removal and submitted to Clare County Council.	
Monitoring	There are a number of obligatory processes required as part of archaeological licence applications to the National Monuments Service and these will allow for monitoring of the successful implementation of the archaeological mitigation measures. A method statement detailing the proposed strategy for archaeological supervision of ground works during the construction phase will submitted for approval to the National Monuments Service as part of the licence application. This will clearly outline the proposed extent of ground works and outline the consultation process to be enacted in the event that any unrecorded archaeological remains are identified, which may include preservation in situ by avoidance or preservation in record by archaeological excavation. A report will be compiled on all archaeological site investigations which will clearly present the results in written, drawn and photographic formats. Copies of this report will be submitted to the National Monuments Service, Clare County Council and the National Museum of Ireland.	None Proposed
EIAR Topic: Chapter 13 Population and Human Health		
None identified	No significant effects have been identified. Mitigation measures to reduce potential environmental impacts during construction are proposed in the OCMP which accompanies the application. Measures to ensure health and safety of residents are set out in other chapters of the EIAR including measures to manage dust, surface water, flood risk, noise and vibration construction traffic and site access. A Project Supervisor for the Construction Phase (PSCP), will be appointed to oversee site and public safety.	Measures to avoid potential negative impacts on population and human health have been fully considered in the design of the project, and are integrated into the final layout and design. Compliance with the layout and design will be a condition of the permitted development. As such no mitigation measures are required.
Monitoring	No specific monitoring is proposed. The Project Supervisor for the Construction Phase (PSCP), will be appointed to oversee site safety and will monitor compliance with health and safety requirements.	None proposed.

Proposed Strategic Housing Development at
Ballymacaula, Drumbiggle, Keelty,
Circular Road, Ennis, Co. Clare

Volume II

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CHAPTER 16

Risks of Major Accidents and Disasters

August 2022

Glenveagh
Home of the new.

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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16 Risks of Major Accidents and Disasters

16.1 Introduction

The Seveso III Directive (2012/18/EU) requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments. For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

The HSA is the Competent Authority in Ireland as defined by Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implement the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the impacts of facilities which fall within the remit of this legislation are taken into account with respect to land use planning. This is achieved through the provision of technical advice to planning authorities.

The HSA does not currently consider the proposed development to be a COMAH facility.

However, in order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents an additional review of the characteristics of the proposed development and of the project location to consider potential for accident scenarios that do not fall under COMAH reporting requirements.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts.

Section 8 of Annex IV of the EIA Directive specifies that the EIAR must include;

“A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.

A major accident can be defined as an acute or chronic accident or disaster, of human or natural origin, which occurs either as a consequence of, or which interacts with, the construction or operation of the proposed Scheme, and which has substantial consequences for people or the environment.

16.1.1 Author Information and Competency

This chapter was prepared by Marcelo Allende (BSc, BEng). Marcelo is a Senior Environmental Consultant (Hydrologist) at AWN with over 15 years of experience in Environmental Consulting and water resources. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI).

16.1.2 Reference to Guidelines Relevant to Discipline and Methodology

The assessment has been carried out generally in accordance with the following guidelines:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022),
- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015),
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).

In the EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute.

The principal attributes (and impacts) to be assessed include the following:

- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any).
- Loss of containment of drug substance material

16.1.3 Source of Information

The collection of baseline regional data was undertaken by reviewing the following sources:

- Office of Public Works (OPW) flood mapping data (www.floodinfo.ie).

Site specific data was derived from the following sources:

- Flood Risk Assessment. Proposed Residential Development, Drumbiggle, Ennis, Co. Clare. Tobin Consulting Engineers. July 2022;
- Civil Works Design Report. Glenveagh Homes Ltd. Residential Development, Ennis, Co. Clare. Tobin Consulting Engineers. July 2022;
- Various site plans and drawings

The layout and extent of the proposed development site is shown in the Chapter 2 (Site Context and Project Description) of this EIAR.

16.1.4 Difficulties Encountered in Compiling Information

There were no major difficulties during the preparation of this chapter

16.2 The Proposed Development

The description of the proposed development is presented in detail in Chapter 2 – Project Description.

The proposed development is located at Ballymacaula, Circular Road, Ennis, Clare which extends in a linear direction along the N85 Ennis By Pass/Western Relief Road. The subject site is located to the northwest of Ennis town. The total site area comprises of 11.32 ha (27.97 acres). There is a net developable area of 8.9Ha.

The development will consist of the following components:

- The construction of 289 no. residential units comprising a mixture of 4, 3 and 2 semi-detached and townhouse/terraced units and 12 no. 1 bed apartments/duplex units:
  - A 60 no. creche/childcare facility.
  - The provision of landscaping and amenity areas.
  - All associated infrastructure and services including 1 no. vehicular access point, roads, parking, lighting and drainage;
  - All associated ancillary development works.

16.3 Description of Existing Environment

16.3.1 Site Description

The site is a greenfield site and is currently in agricultural use which comprises mature ditches and hedgerows. To the east of the site, the land abuts the R474 regional road (Circular Road) and there are a number of existing one-off houses located immediately east of the subject site. To the northeast

of the site lies the Ennis Golf Club. To the west of the site lies the N85 Ennis By Pass/Western Relief Road and the Beechpark Roundabout lies south west of the site. The lands to the south are surrounded by a residential housing estate comprising forty two units. The Claureen River is located 400m west of the subject site.

16.3.2 Topography

Existing ground levels are approximately 5mOD at the northern redline boundary at the River Claureen, with levels within the developable area ranging from approximately 13.4mOD at the north-eastern corner to approximately 31.2mOD at the southwestern corner.

16.3.3 Flood Risk

A detailed Site Specific Flood Risk Assessment was carried out by Tobin (2022) and forms part of this SHD application.

The Planning System and Flood Risk Management (PSFRM) Guidelines (OPW/DoEHLG, 2009) classify residential development as "highly vulnerable" in terms of sensitivity to flooding. As such, the proposed development should be constructed in Flood Zone C, where there is less than a 0.1% Annual Exceedance Probability (AEP) of flooding.

The redline boundary of the site is approximately 11.32ha, while the developable area (8.9ha)is confined to lands appropriately zoned for development, and outside areas of flood risk. Any works outside the developable area are associated with drainage design and footpath connections, and all vulnerable elements are located within the developable area.

16.3.3.1 Fluvial Flooding

Based on the results of hydraulic modelling carried out as part of the OPW's PFRA and CFRAM programme, it is estimated that the developable area is located in Flood Zone C, where there is less than an 0.1% AEP of fluvial flooding. Given that all vulnerable infrastructure and access routes are located within the developable area, with FFLs providing more than 9m freeboard above predicted flood levels, it is predicted that fluvial flood risk to the development is minimal.

Within the redline boundary, areas adjacent to the N85 bridge are indicated as liable to fluvial flooding. All vulnerable elements, access routes, and the proposed attenuation pond are located outside the area of predicted flooding in a 0.1% AEP MRFS fluvial event. Works within the floodplain are associated with the stormwater outfall to the River Claureen, and will not impact existing ground levels. As such, the proposed development is not anticipated to impact fluvial flow routes or floodplain storage, and will not increase flood risk elsewhere. Refer to Figure 16.1 below for further details.

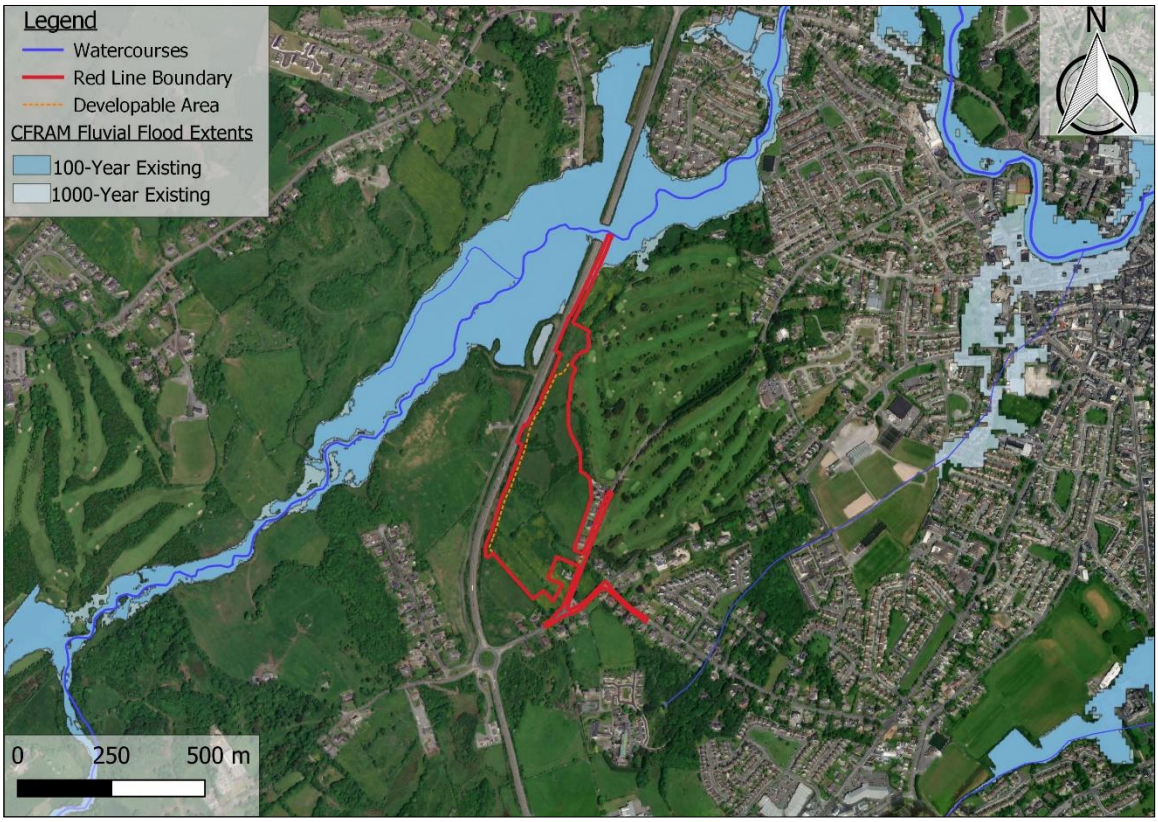

Figure 16.1: Fluvial Flooding Map (Source: Tobin, 2022)

16.3.3.2 Pluvial Flooding

Based on the indicative pluvial flood mapping presented in the OPW Preliminary Flood Risk Assessment, it is estimated that an area adjacent to the eastern site boundary may be liable to pluvial flooding.

Surface water arising at the site will be managed by a dedicated stormwater drainage system and on-site attenuation designed in accordance with SuDS limiting discharge from the site to greenfield runoff rates.

The landscaping and topography of the site will provide safe exceedance flow paths and prevent surface water ponding to minimise residual risks associated with extreme flooding or blockage of the stormwater drainage system, minimizing the potential for pluvial flooding.

16.3.3.3 Groundwater Flooding

There is no evidence to suggest groundwater as a potential source of flood risk to the proposed development site.

16.3.3.4 Coastal Flooding

Based on previous flood studies for the area, the proposed development site in not at risk of tidal flooding during a 0.1% AEP MRFS tidal flood event, where coastal waters do not extend upstream to the vicinity of the subject site.

Based on the findings of this Flood Risk Assessment, the proposed development is designed in accordance with the Planning System and Flood Risk Management Guidelines.

The sequential approach has been appropriately adopted, locating works within the developable area and all proposed residential dwellings and access roads within Flood Zone C.

As the developable area is located outside predicted flow paths and floodplain extents, and surface water arising at the site will be managed by a dedicated stormwater drainage system designed in accordance with SuDS limiting discharge from the site to greenfield runoff rates, it is predicted the development will not increase flood risk elsewhere.

It has been concluded that the site of the new works lies within Flood Zone C (i.e., where the probability of flooding is less than 0.1% AEP or 1 in 1000 year for river flooding) as defined by the guideline document to Planning Authorities in relation to Flood Risk Management.

16.3.4 Seismic Activity

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result.

In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

There are no active volcanoes in Ireland.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland including IWEX on Carrickbyrne Hill, Co. Wexford, running from 01/01/2011 and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events (refer to Figure 16.2 below).

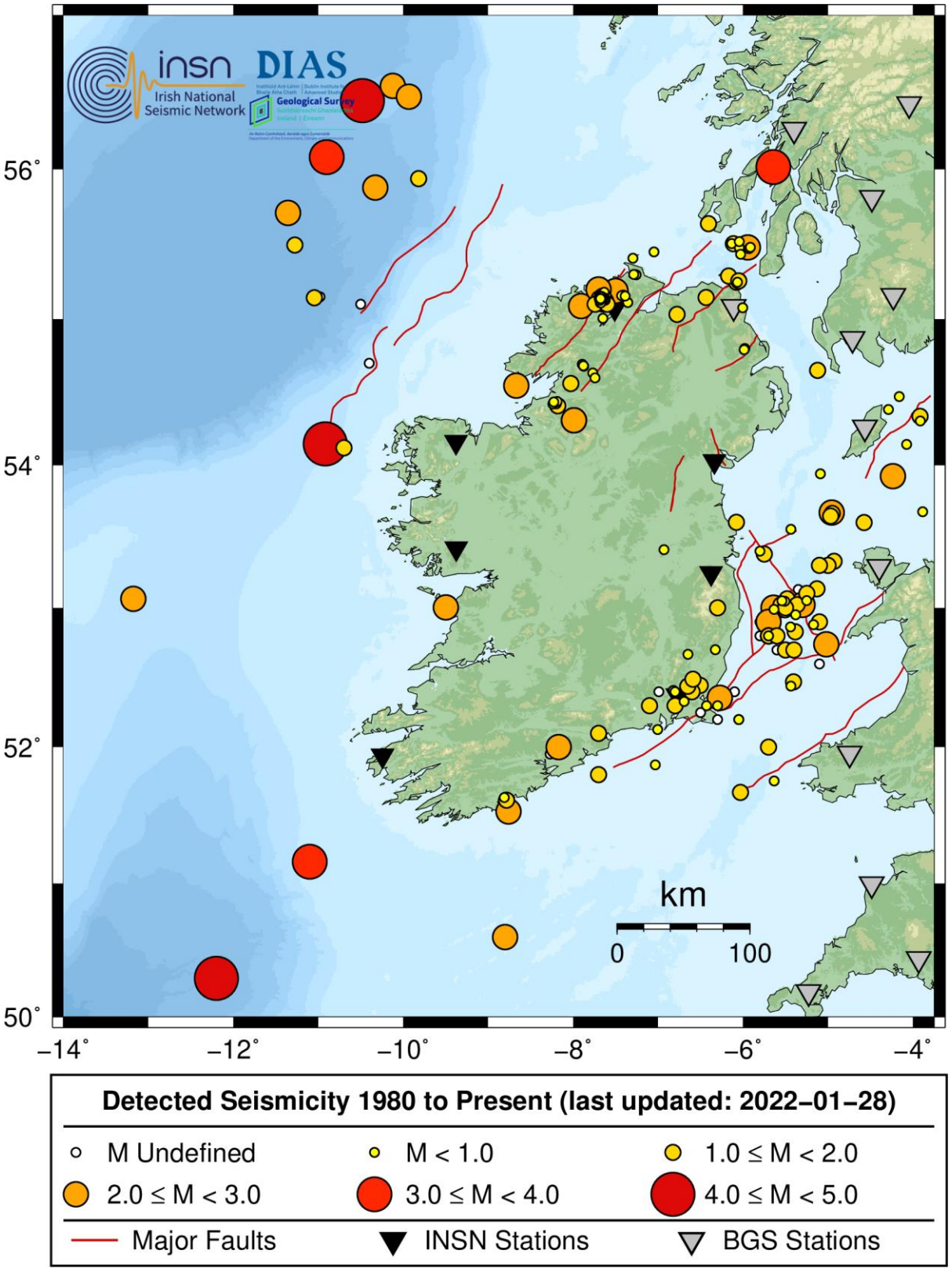

Figure 16.2: Seismic Movements (Source: Irish National Seismic Network)

As can be seen in Figure 16.2 above, the principal events have occurred along/ beyond the east, south-east and south of Ireland with seismic movements generally up to 2.9 Magnitude recorded on land with no seismic events recorded in the immediate vicinity of the Ennis site.

16.4 Predicted Impacts

The potential impacts of the construction and operational phases of the Proposed Development are outlined below.

16.4.1 Do Nothing Scenario

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no construction at this site. There would, therefore, be a neutral effect in terms of risk of major accidents and disasters.

The evolution of the above baseline is not expected to be significant in the future, in terms of risk of major accidents and disasters. Climate change has been taken into account in the flooding risk carried out by Tobin (2022).

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal.

16.4.2 Construction Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

16.4.3 Operational Phase

The proposed development is not located in an area prone to flooding or an area prone to seismic events. As such, these accident scenarios are not of concern.

16.4.4 Cumulative

The cumulative effects of proposed development on major accidents and disasters have been assessed taking other planned, existing and permitted development in the surrounding area as outlined in Table 1.2 of the Introduction chapter. All planning permissions that have been granted and developed have been incorporated into the baseline assessment of this application. Cumulative impacts are considered imperceptible and neutral.

All cumulative impacts have been detailed in the relevant technical chapters and are summarised in Chapter 15.

16.5 Mitigation Measures

No specific measured are proposed. However, it should be noted that a building Lifecyle report has been prepared by Deady Gahan as part of this application which provides the outline specification of materials and infrastructure to be utilised for the proposed development.

16.5.1 Monitoring

No monitoring is proposed.

16.6 Residual Impacts

The residual impact is considered to be imperceptible and neutral

16.7 References

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022).
- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015).
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).
- Office of Public Works (OPW, www.floodinfo.ie).