Enviroguide CONSULTING

Environmental Impact Assessment Report

PRESENTED TO

Ballykeeran Gardens LRD
Proposed Residential Development

March 2023

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1 INTRODUCTION AND METHODOLOGY

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been commissioned by Akiyda Limited (the "Applicant"), in respect of a residential Development for lands at Cornamaddy and Ballykeeran, Athlone.

This EIAR has been compiled in accordance with current legislation and established good practice guidance. This chapter describes the methodology by which the Environmental Impact Assessment (EIA) was carried out and the EIAR was completed. The methodology used is broadly consistent across all chapters in order to ensure the EIAR is clear and easy to navigate.

1.1.1 Quality Assurance and Competence

Synergy Environmental Ltd., T/A Enviroguide Consulting, is a wholly Irish owned multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All of our 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. Professional memberships include the Institute of Geologists of Ireland (IGI), Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

1.1.2 Description of the Proposed Development

The Applicant is seeking planning permission for the 332 new homes and associated features. The planning description is:

a) Site excavation works to facilitate the Proposed Development to include excavation and general site preparation works.
b) The provision of a total of 172 no. residential dwellings which will consist of 152 no. 3bed units and 20 no. 4 bed units.
c) The provision of a total of 160 no. apartments/duplex units consisting of 36 no. 1 bed units, 99 no. 2 bed units and 25 no. 3 bed units.
d) Provision of a creche.
e) Provision of associated car parking at surface level via a combination of in-curtilage parking for dwellings and via on-street parking for the creche, duplexes and apartment units.
f) Provision of electric vehicular charge points with associated Site infrastructure ducting to provide charge points for residents throughout the Site.
g) Provision of associated bicycle storage facilities at surface level throughout the Site and bin storage facilities.

h) Provision of a new link road via adjacent lands to the west to provide for vehicular, pedestrian and cyclist access.
i) The provision of internal culverts and associated two bridges along with a realignment of a section of an existing drainage channel within the Site to facilitate internal access roads along with associated crossing points across the drainage channel (to facilitate pedestrian and vehicular crossing points).
j) The creation of a pedestrian footpath alongside the local road which will connect to the existing footpath aligning the N55 National Road.
k) Provision of associated open space areas, residential communal open space areas to include a formal play area along with all hard and soft landscaping works for private gardens and amenity spaces along with public lighting, planting and boundary treatments to include boundary walls, railings and fencing.
l) Provision of 2 no. ESB substations.
m) Internal Site works and attenuation systems.
n) All ancillary Site development/construction works to facilitate foul, water and service networks for connections to the existing foul, water and ESB networks.

1.2 Definition of EIA and EIAR

EIA is a systematic examination of the potential impacts of a Proposed Development on the environment. In assessing the environmental impacts this EIAR will evaluate the existing situation and assess any potential impacts of the Proposed Development. Where potential impacts are identified proposed mitigation measures will be identified. In addition, the in-combination effects of any other known plans or projects will be identified and assessed.

Under Schedule 5 of the Planning and Development Regulations 2001, as amended (the Planning Regulations), an EIAR (formerly an EIS) is required to accompany certain planning applications for specified projects as part of the EIA process.

The EIAR describes the outcomes of the iterative EIA process which was progressed in parallel with the project design process. In doing so, it forms the first part of the EIA process that will be completed by Westmeath County Council, as the competent authority, which in turn will be required to examine, analyse, and evaluate the direct and indirect effects of the development on the various factors listed in Directive 2011/92/EU, as amended by 2014/52/EU (the EIA Directive).

> *"The EIAR should be prepared at a stage in the design process where changes can still be made to avoid adverse effects. This often results in the modification of the project to avoid or reduce effects through redesign" (EPA, 2017)*

Where significant and likely environmental effects are identified that are unacceptable, the EIA process aims to quantify and minimise the effects of the impact that the specified development has on the environment through appropriate mitigation measures and where necessary, subsequent monitoring.

This process is illustrated in Figure 1-1.

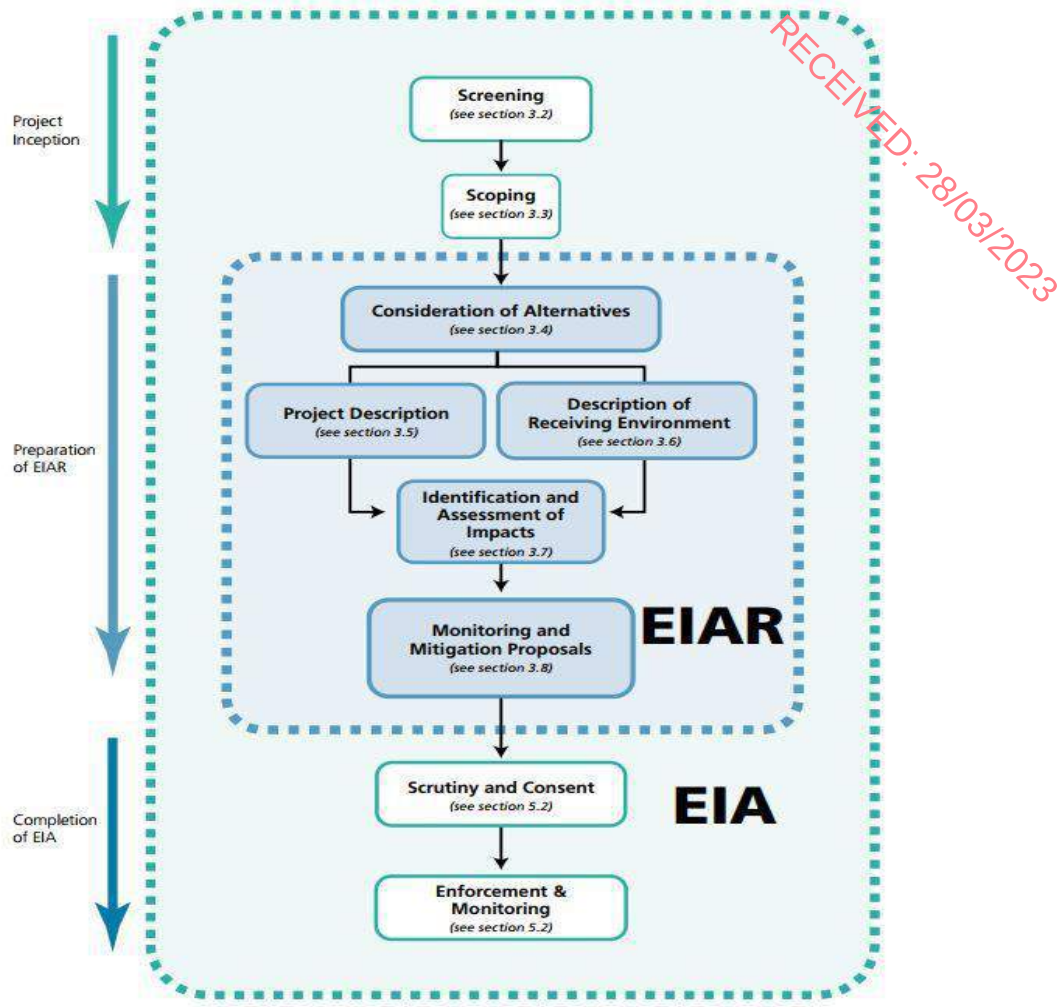

Figure 1-1: EIA Process (European Union, 2017)

The purpose of the EIAR is to provide the Planning Authority with information on the likely and significant effects on the environment by the Proposed Development. This EIAR was prepared in parallel with the project design process and reflects the potential cumulative impact of other developments.

1.3 EIA Legislation

The EIA Directive requires EIA to be carried out for certain projects as listed in Annex I of the Directive. The EIA Directive is transposed into Irish law through the Planning and Development Act 2000 (as amended) (the Planning Act) and the Planning Regulations.

1.4 EIA Guidelines

This EIAR has been prepared in accordance with key relevant guidance. The documents listed below are common to all Chapters. Additional specific guidelines will be referred to in each specific Chapter.

- 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);
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA draft September 2015a);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA May 2022);
- Environmental Assessments of Plans, Programmes and Projects – Rulings of the Court of Justice of the European Union (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Union 2017);
- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union 2013);
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Union 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland 2018);
- Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems; (Department of Housing, Planning, Community and Local Government 2017);
- Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999); and
- Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (European Communities 2003).
- Appropriate Assessment Screening for Development Management; OPR Practice Note PN01(Office of the Planning Regulator March 2021).
- Environmental Impact Assessment Screening; Office of the Public Practice Note (PN02) (June 2021)

The EIA Directive defines EIA as a process. Article 1(2)(g) states that EIA means:

> *"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);*

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point;

(iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The EIA Directive requires the EIAR to identify, describe and assess, in an appropriate manner and in light of each individual case, the direct, indirect, and cumulative significant effects of the Proposed Development on factors of the environment including:

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 (respectively, the Habitats Directive and the Birds Directive)
c) Land, soil, water, air and climate
d) Material assets, cultural heritage, and the landscape

The interaction between the factors referred to in points (a) to (d)

1.5 Screening for EIA

'Screening' is the term used to describe the process for determining whether a Proposed Development requires an EIA by reference to mandatory legislative threshold requirements or in the case of sub threshold development, by reference to the type and scale of the Proposed Development and the significance or the environmental sensitivity of the receiving baseline environment.

Annex 1 of the EIA Directive requires as mandatory an EIA for all development projects listed therein.

Schedule 5, Part 1, of the Planning Regulations transposes Annex 1 of the EIA Directive directly into Irish planning legislation. An EIAR is required to accompany a planning application for development of a class set out in Schedule 5, Part 1 of the Planning Regulations which exceeds a limit, quantity or threshold set for that class of development.

Schedule 5, Part 2 of the Planning Regulations defines projects that are assessed on the basis of set mandatory thresholds for each of the project classes including:

"Schedule 5, Part 2 - Infrastructure projects

> ***10(b)(iv) Urban development which would involve an area greater than 2 hectares in the case of a 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 city or town in which the predominant land use is retail or commercial use.)***

The Proposed Development constitutes an "urban development" as it is a housing development. According to the Interpretation of Definitions of Project Categories of Annex I and II Document (European Commission, 2015), "*Housing developments, in particular, are frequently included in the 'urban development projects' category*".

The total area of the Proposed Development site is approximately 12.28 ha. It is greater than the 10-hectare threshold for an urban development and accordingly, an EIAR is being prepared as part of this application.

1.6 Scope of the EIAR

'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is defined in EC Guidance on EIA Scoping 2001 as:

> '*Determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'*

The content of this EIAR was informed by a scoping process carried out by the Applicant, design team and EIAR consultants to identify the core issues likely to be most important during the EIA process.

The EIAR prepared for the Proposed Development has endeavoured to be as thorough as possible and therefore all of the issues listed in Schedule 6, Sections 1 and 2 of the Planning Regulations have been addressed in the EIAR.

The scope of this EIAR has had regard to the documents listed in Section 1.4 above, together with:

- The requirements of Part X of the Planning Act and also Part 10 of the Planning Regulations;
- The requirements of the Westmeath County Council Development Plan;
- Relevant Regional and National Planning Policy Documents;
- The receiving environment and any vulnerable or sensitive local features and current uses;
- Previous relevant planning history and applications that have been submitted on the subject and adjoining lands;
- The likely and significant impacts of the Proposed Development on the environment; and
- Available mitigation measures for reducing or eliminating any potentially significant undesirable impacts.

In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

1.7 Purpose and Objectives of the EIAR

The purpose of this EIAR is to assist in the EIA process, by identifying likely significant environmental impacts resulting from the Proposed Development, to describe the means and extent by which they can be reduced or mitigated, to interpret and communicate information about the likely impacts and to provide an input into the decision making and planning process.

The fundamental principles to be followed when preparing an EIAR are:

- Anticipating, avoiding, and reducing significant effects;
- Assessing and pursuing preventative action;
- Maintaining objectivity;
- Ensuring clarity and quality;
- Providing relevant information to decision makers; and
- Facilitating public and stakeholder consultation.

EIA is an iterative process. The EIAR captures this assessment process and describes its outcomes. The EIAR documents the consideration of environmental effects and provides transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes.

The EIAR provides information on any identified effects arising as a consequence of the Proposed Development and which:

- Are environmentally based;
- Are likely to occur; and
- Have significant and adverse effects on the environment.

It also documents how the design of the Proposed Development incorporates measures for the purposes of impact avoidance, reduction or amelioration; as well as to explain how significant adverse effects will be avoided.

The key objective of this EIAR is to inform the Planning Authority on the acceptability of the Proposed Development, in carrying out an EIA, in order to reach a decision in the full knowledge of the Proposed Development's likely significant impacts on the environment, if any.

1.8 Format and Structure of this EIAR

The formation of an EIAR necessitates the co-ordination and collation of associated, yet diverse specialised areas of assessment. The EIA approach involves the examination of each environmental factor, describing the existing baseline environment, the Proposed

Development, its likely impacts, and direct and indirect significant effects pertaining to that environmental factor and mitigation measures, where appropriate.

The topics examined in this EIAR are categorised under the environmental factors prescribed under the EIA Directive:

- Population and Human Health
- Biodiversity
- Land and Soils
- Water
- Air
- Climate
- Material Assets
- Cultural Heritage
- Landscape

The expected effects deriving from the vulnerability of the Proposed Development to risks of major accidents and/or disasters must also be examined.

The structure of the EIAR is set out in Table 1-1.

Table 1-1: Structure of the EIAR

Chapter	Title	Content
1	Introduction and Methodology	Chapter 1 sets out the purpose, methodology and scope of the document.
2	Description of the Proposed Development & Assessment of Alternatives	As required under Article 5(1)(a) of the EIA Directive 2014/52/EU (subsequently referred to as the Directive), Chapter 2 provides a description of the Site, design and scale of Proposed Development, and as required under Article 5(d), an evaluation of the reasonable alternative design approaches.
3	Planning and Development Context	Chapter 3 sets the national, regional, and local policy framework for the Proposed Development.
4	Population and Human Health	Chapter 4 covers the requirement for assessment on potentially significant effects to population and human health as required under Article 3(1)(a) of the Directive.
5	Biodiversity	Chapter 5 covers the requirement of Article 3(1)(b) of the Directive to assess potentially significant effects on biodiversity (which previously referred only to 'fauna and flora'), having particular attention to species and habitats protected under the Habitats Directive and the Birds Directive.
6	Land and Soils	Chapter 6 covers the requirement under Article 3(1)(c) of the Directive on Land and Soil to assess the type of soil and geology

Chapter	Title	Content
		in the area of the Proposed Development and identifies any potentially significant effects.
7	Hydrology	Chapter 7 covers the requirement under Article 3(1)(c) of the Directive to assess potentially significant effects to water quality arising from the Proposed Development. This Chapter will assess any potential effects from pollution and discharges to surface water.
8	Air Quality and Climate	Chapter 8 covers the requirement under Article 3(1)(c) of the Directive on Air and Climate to assess potentially significant effects to air quality in the surrounding environment.
9	Noise and Vibration	Chapter 9 covers the requirement to assess potentially significant effects from airborne noise and vibration as required under Article 3(1)(a) of the Directive on Human Health.
10	Landscape and Visual Amenity	Chapter 10 covers the requirement under Article 3(1)(d) of the Directive to assess potentially significant effects on the landscape. This Chapter will assess any potential visual impacts to landscape caused by the Proposed Development.
11	Archaeology and Cultural Heritage.	Chapter 11 covers the requirement under Article 3(1)(d) of the Directive to assess potentially significant effects on cultural heritage.
12	Material Assets - Utilities and Waste Management	Chapter 12 covers the requirement under Article 3(1)(d) of the Directive to assess potentially significant effects on material assets. This Chapter will identify impacts to existing utilities and infrastructure from the development of the Proposed Development. Article 5(1), Annex IV, point 1(d) of the Directive requires estimates of quantities and types of waste produced during construction and operation phase. Chapter 12 will also present an assessment of how resources and waste will be managed for the Proposed Development.
13	Risk Management	Chapter 13 covers the requirement under Article 3(2) of the Directive to include the expected effects deriving from the vulnerability of the Proposed Development to risks of major accidents and/or disasters.
14	Interactions	As required under Article 3(1)(e) of the Directive, Chapter 14 provides an assessment of the interaction between all of the environmental aspects referred to in this EIAR.
15	Mitigation and Monitoring	Chapter 15 describes mitigation and monitoring as required under Article 5(1) of the Directive in order to avoid, prevent, reduce, or if possible, offset any identified significant adverse effects on the environment and, where appropriate, describes any proposed monitoring arrangements.
Volume III (Volume 3)	Traffic Impact Assessment	Volume III sets out the traffic impacts from the Proposed Development.

This approach employs standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration.

1.9 Methodology used to Produce this EIAR

The approach taken for each technical chapter is detailed in Table 1-2.

The methodology will outline the methods used to evaluate the baseline environmental conditions as well as predict the likely impacts on the environment of the Proposed Development. The data and survey requirements for each chapter will vary depending on the environmental topic and will be chosen by the specialist based on relevant legislation, best practice guidance, policy requirements, and professional judgement. Similarly, the study area is also defined for each environmental topic based on professional judgement and experience.

All environmental topics require desktop reviews of all relevant data at a minimum. These desktop studies are then supplemented by field studies and consultations with relevant stakeholders, for example interested parties, statutory bodies, and local authorities, as required for each environmental topic.

An outline of the methodology employed consistently in each Chapter of the EIAR to examine each environmental topic is provided below:

Table 1-2: Methodology Employed to Produce each EIAR Chapter.

Chapter	Methodology
Introduction	Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
Study Methodology	This subsection outlines the method by which the relevant impact assessment has been conducted within that Chapter.
The Existing Receiving Environment (Baseline Situation)	This section will describe and assess the receiving environment, the context, character, significance, and sensitivity of the baseline receiving environment into which the Proposed Development will fit. This analysis also takes account of any other Proposed Developments that are likely to proceed in the immediate surroundings.
Characteristics of the Proposed Development	Consideration of the '*Characteristics of the Proposed Development'* allows for a projection of the '*level of impact'* on any particular aspect of the environment that could arise. For each Chapter, those characteristics of the Proposed Development which are relevant to the area of study are described; for example, the Chapter on landscape and visual impact addresses issues such as height, design and impact on the surrounding landscape.
Potential Impact of the Proposed Development	This section provides a description of the specific, direct, and indirect, effects that the Proposed Development may have. This analysis is provided with reference to both the Existing Receiving Environment and Characteristics of the Proposed

Chapter	Methodology
	Development sections, while also referring to the: (i) magnitude and intensity, (ii) integrity, (iii) duration and (iv) probability of impacts. The assessment addresses whether the impacts are direct, indirect, secondary, or cumulative in nature. It also looks at the timescale of such impacts e.g. are they short, medium, long-term, and are they of a temporary, permanent, continuous or intermittent nature, and are they positive or negative impacts. The impact interactions are also addressed.
Do Nothing Impact	In order to provide a qualitative and equitable assessment of the Proposed Development, this section considers the Proposed Development in the context of the likely impacts upon the receiving environment should the Proposed Development not take place.
Avoidance, Remedial and Mitigation Measures	This section of each Chapter describes the mitigation measures which are required. The requirement to describe mitigation measures is laid out in the EIA Directive, as implemented by the Planning Act and the Planning Regulations. Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential impacts of the Proposed Development. This includes avoidance, reduction and remedy measures as set out in Section 4.7 of the Development Management Guidelines 2007, to reduce or eliminate any significant adverse impacts identified.
Residual Impacts of the Proposed Development	This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term, temporary, permanent, continuous, or intermittent, positive and negative effects as well as impact interactions which the Proposed Development may have, assuming all mitigation measures are fully and successfully applied.
Monitoring	This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring.
Reinstatement	While not applicable to every aspect of the environment considered within the EIAR, certain measures may need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.
Interactions	This section provides a description of impact interactions together with potential indirect, secondary, and cumulative impacts.
Difficulties Encountered in Compiling Information	The EIA Directive requires that the EIAR includes *'details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved'* (EIA Directive, Annex IV, Part 6). Each Chapter that contains an environmental baseline and assessment contains a section outlining any difficulties encountered in compiling that Chapter.

1.10 EIAR Project Team

Table 1-3 EIAR Project Team

Chapter	Consultant Name and address	Specialist Area
1.0 Introduction and Methodology including Non-Technical Summary	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Arthur Greene	Multidisciplinary Planning and Environmental Consultants
2.0 Project Description and Alternatives Examined	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Mairead Foran	Multidisciplinary Planning and Environmental Consultants
3.0 Planning and Policy Context	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Mairéad Foran	Planning and Development Consultants
4.0 Population and Human Health	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
5.0 Biodiversity	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Rozalyn O'Hora	Multidisciplinary Planning and Environmental Consultants
6.0 Land and Soils	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Claire Clifford and Sam Marchant	Multidisciplinary Planning and Environmental Consultants
7.0 Hydrology	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Claire Clifford & Sam Marchant	Multidisciplinary Planning and Environmental Consultants
8.0 Air Quality and Climate	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Planning and Environmental Consultants
9.0 Noise and Vibration	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Planning and Environmental Consultants

Chapter	Consultant Name and address	Specialist Area
10.0 Landscape and Visual Amenity	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Nuno Costa	Multidisciplinary Planning and Environmental Consultants
11.0 Archaeology, Architectural, and Cultural Heritage	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Arthur Greene	Multidisciplinary Planning and Environmental Consultants
12.0 Material Assets: Waste, and Utilities	Waste & Utilities Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants Transport Consultants
13.0 Risk Management	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
14.0 Interactions	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Arthur Greene	Multidisciplinary Planning and Environmental Consultants
15.0 Mitigation and Monitoring Measures	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Arthur Greene	Multidisciplinary Planning and Environmental Consultants
Volume III Traffic Impact Assessment	Roadplan Consulting, Kilkenny, R95 N4FE Richard Frisby	Transport Consultants

1.11 Non-Technical Summary

A Non-Technical Summary of the EIAR has also been prepared. The EIA Directive states that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions. EPA Guidelines note that the non-technical summary of the EIAR should facilitate the dissemination of the information contained in the EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made Westmeath County Council. A Non-Technical Summary of the EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document.

1.12 Links between EIAR and Appropriate Assessment

A Screening Report for Appropriate Assessment (AA) and Natura Impact Statement has been carried out for the Proposed Development to determine if there is a risk of effects to any Natura 2000 site.

While an AA is required by the proposer of any plan or project likely to have an adverse effect on a Natura 2000 site, EIA is required for projects listed in Annex I of the EIA Directive. The requirement for EIA relative to projects listed in Annex II of the EIA Directive is determined on a case-by-case basis. While these two different types of assessment are independent and are required by separate legislation, namely the Birds and Habitat Directives and the EIA Directive there is a degree of overlap, particularly in the biodiversity Chapter of the EIAR.

1.13 Availability of EIAR Documents

A copy of this EIAR document and Non-Technical Summary is available for purchase at the offices of Westmeath County Council at a fee not exceeding the reasonable cost of reproducing the document.

1.14 Statement of Difficulties Encountered

No exceptional difficulties were experienced in compiling the necessary information for the Proposed Development. Where any specific difficulties were encountered these are outlined in the relevant Chapter of the EIAR.

1.15 Quotations

However, it is important to acknowledge that the EIAR by its nature contains statements about the Proposed Development, some of which are positive and some less than positive. Selective quotation or quotations out of context can give a very misleading impression of the findings of the study. Therefore, the study team urge that quotations should, where reasonably possible, be taken from the conclusions of specialists' sections or from the Non-Technical Summary and not selectively.

2 PROJECT DESCRIPTION AND DESCRIPTION OF ALTERNATIVES

2.1 Introduction and Terms of Reference

This Chapter provides a detailed description of the Proposed Development together with details of the existing environment. In accordance with Article 5(1)(a) of the EIA Directive, the description of the project should comprise:

'information on the site, design, size and other relevant features of the project'.

The EIAR must contain information in relation to the environmental impact of both the Proposed Development and all other "reasonable" alternatives studied. An indication of the main reasons for the option chosen must be given, taking into account the effects of the Proposed Development on the environment.

This Chapter was prepared by Enviroguide Senior Environmental Consultant Mairéad Foran. Mairéad Foran, has a B.A. (Moderatorship) in Environmental Sciences from Trinity College Dublin, and an Advanced Diploma in Planning and Environmental Law from King's Inns College, Dublin. Mairéad has over 4 years professional experience as an Environmental Consultant and experience working on a large number of EIARs and EIA Screening Reports for projects of a similar scale to that of the Proposed Development.

2.2 Site Location and Description

The Proposed Development site is located within the townlands of Ballkeeran and Cornamaddy Athlone, Co. Westmeath. The Proposed Development lies within the Westmeath jurisdiction. It lies to the north-western side of the N55 road. The site is currently a greenfield site with surrounding land use comprised of residential, commercial, and civic land use.

Immediately adjacent to the site boundary is the BMW Athlone site and residential developments. Currently the Site of the Proposed Development is characterized by open and undulating farmland with hedgerows along the perimeter. The topographical survey of the Proposed Development Site indicates that the overall topography ranges from approximately 48.75m above ordnance datum (mAOD) in the southwest to approximately 39.65m AOD to the central west of the site. In general, the site is gently sloping from east to west.

The main vehicular entrance location for the site is off a new access road from the N55 round about which also provides access for the permitted Glenveagh development. The site area comprises a greenfield parcel of lands measuring 12.28 hectares (gross area), proximate to existing residential developments.

The site is located within the functional area of the Athlone Town Development Plan 2014-2020 (ATDP) and is zoned as

- Proposed residential;
- Existing residential; and
- Open space.

The Records of Monuments and Places was consulted and found 13 no. recorded archaeological monuments within 2 km radius of the Proposed Development. There are 1 no. buildings of architectural significance located with 2km of the Proposed Development Site. There are

no protected structures located within the Site of the Proposed Development. There is a total of ten SACs (Special Areas of Conservation), three SPAs (Special Protection Areas), seventeen pNHAs (Proposed Natural Heritage Areas) and four NHAs (Natural Heritage Areas) located within the precautionary ZOI of the Site. The closest designated site is located 0.9km from the Proposed Development.

The Site of the Proposed Development is within the Upper Shannon catchment WFD catchment and the Shannon [Upper] sub catchment (EPA, 2023). The Shannon (Upper) river transects the Site, flowing from east to west before flowing in a northern direction along the western boundary of the Site.

Ambient air quality monitoring and assessment in Ireland is carried out in accordance with the requirements of the CAFE Directive. The CAFE Directive has been transposed into Irish legislation by the Air Quality Standards Regulations (S.I. No. 180 of 2011). The CAFE Directive requires EU member states to designate 'Zones' reflective of population density for the purpose of managing air quality. The Site of the Proposed Development is located at lands at Cornamaddy and Ballykeeran, Athlone and falls under the 'Zone C' category based on the EPA CAFE Directive.

A site-specific flood risk assessment (FRA) report was produced (EOBMS, 2022a) for the Proposed Development Site, and determined that the site is within Zone C (where the probability of flooding from rivers and the sea is low less than 0.1% or 1 in 1000 for both river and coastal flooding). A review of the Athlone Flood Relief Scheme indicated the majority of the flooding close to site was caused by the river approximately 2.5km south with no potential impact on the Proposed Development Site. There are no past flood events recorded within 2km of the Site. The Proposed Development is considered to be adequately protected in consideration of future scenario of flood events in the area.

2.3 Site History / Background

The Site of the Proposed Development is located on greenfield land, currently characterised by open and undulating farmland. The most recent planning permission granted on the lands of the Proposed Development Site was in 2002.

1. **File Number**: 01811080
   Applicant: Alan Smith
   Development Description: 19 no. Two-Storey Houses
   Permission Granted on 12/12/2022.

Previous planning applications include the following:

2. **File Number**: 063146
   Applicant: Helen Glennon & Ray Finlay
   Development Description: Permission for 193 residential units and associated works
   Permission Refused on 08/10/2006.

3. **File Number**: 083014
   Applicant: Michael Prenty
   Development Description: Permission for 120 residential units, creche and associated works

Withdrawn

4. **File Number**: 083015
   Applicant: Helen Glennon & Ray Finlay
   Development Description: Demolition & Permission for 194 units, creche and associated works
   Withdrawn

Adjacent to the Proposed Development Site, application under reference 22/253 by Marina Quarter Ltd proposes a residential scheme on adjacent lands along with a link road that will provide access to the lands.

2.4 Construction of the Proposed Development

The Proposed Development will be carried out in 3 no. phases. The phasing approach will ensure completion of car parking and open space/site works in totality prior to the occupancy of each phase of the development.

Phase 1 (3.5 years timeframe required)

- Construction of 152 residential units housed in single family houses and apartment buildings.
- Construction of a Creche 0.12ha in size. (It is predicted 148 no. residential units will require provision of childcare. The proposed creche can readily accommodate 48 no. childcare spaces, which is considered adequate to meet the requirement generated by the Proposed Development, along with additional headroom of 20% if required to serve the wider area (Schools Childcare and Social Infrastructure Assessment, Genesis Planning Consultants, February 2023)).
- Construct the link road and cycle/pedestrian links with associated infrastructure works.
- Carry out ancillary planting and landscape works and child play areas.
- Provide open space within this phase to ensure play/green spaces for new residents.

Phase 2 (2.5 year timeframe required)

- Construction of 148 residential units within apartments and duplex units.
- Completion of the access road and ancillary landscaped spaces.
- Completion of the Proposed Development's open space network and green corridors.

Phase 3 (2 year timeframe required)

- Construction of 32 houses.
- Completion of associated access road and ancillary landscaped spaces.
- Completion of developments open space network and green corridors.

Refer to Figure 2-1 for the Site Location and Figure 2-2 details the Phasing Plan for the Proposed Development.

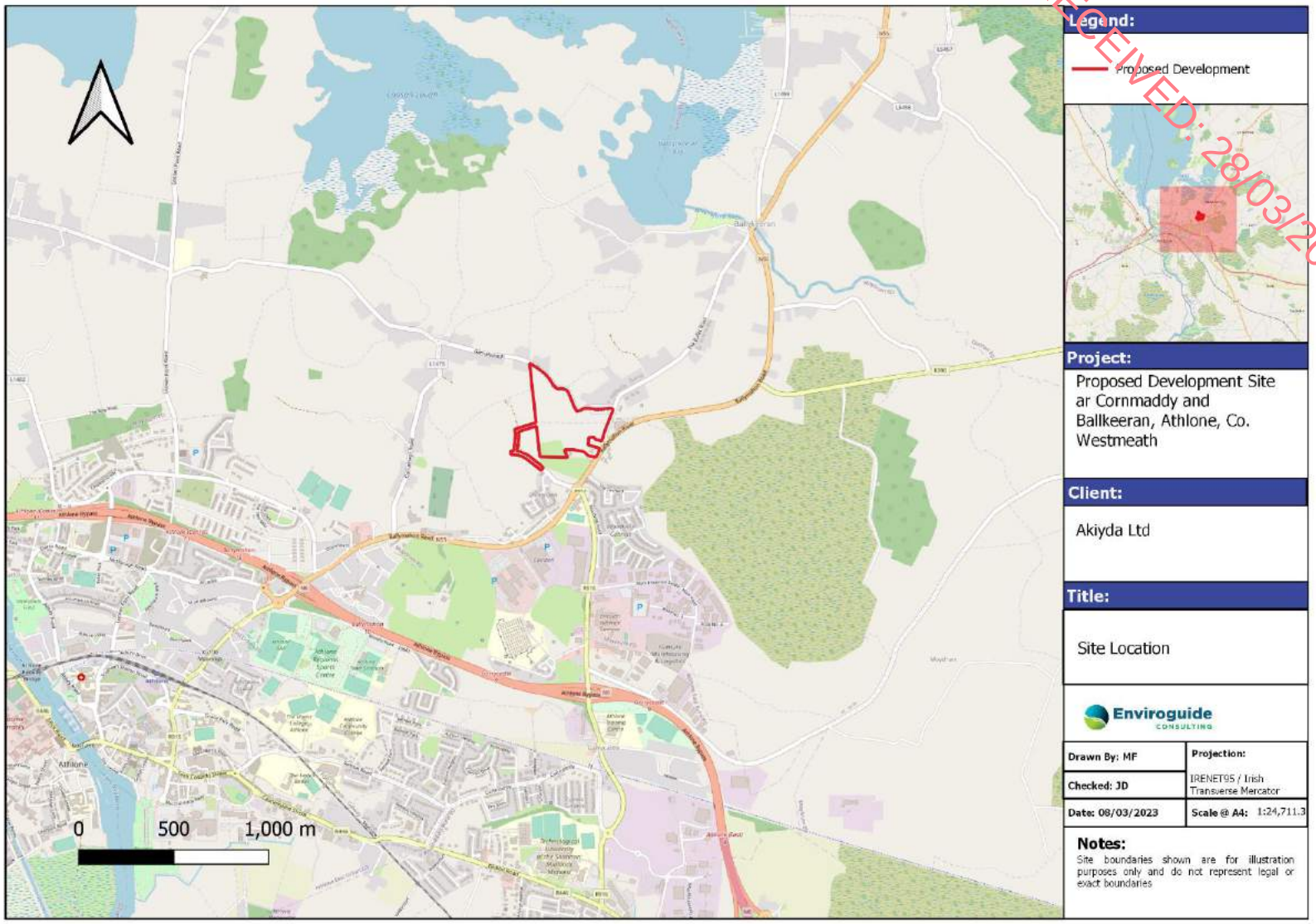

Figure 2-1 Site Location

Figure 2-2 Site Layout Plan 1 (Arnold Leahy Architects, 21.02.2023 – southern extent of the site)

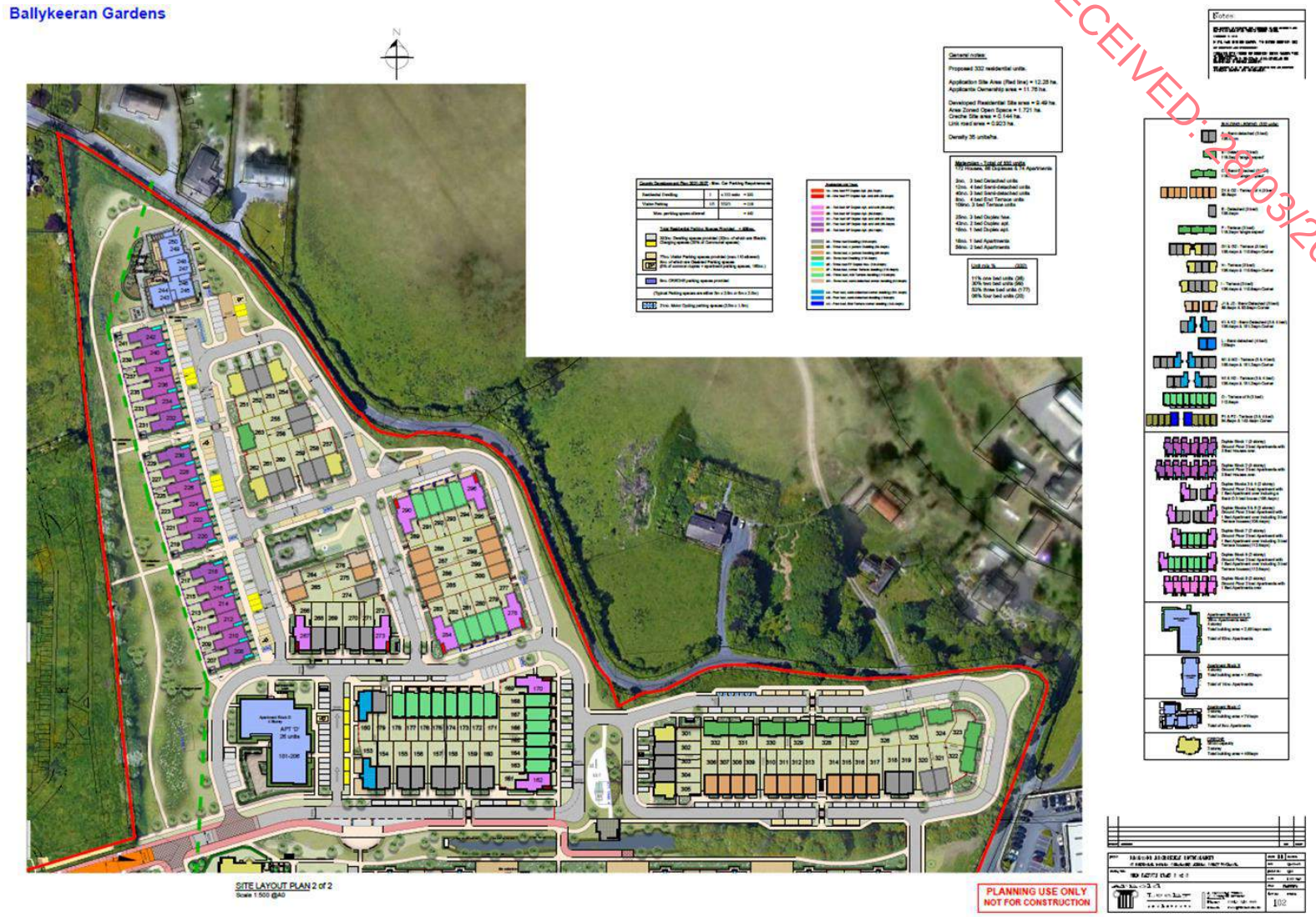

Figure 2-3 Site Layout Plan 2 (Arnold Leahy Architects, 21.02.2023 – northern extent of the site)

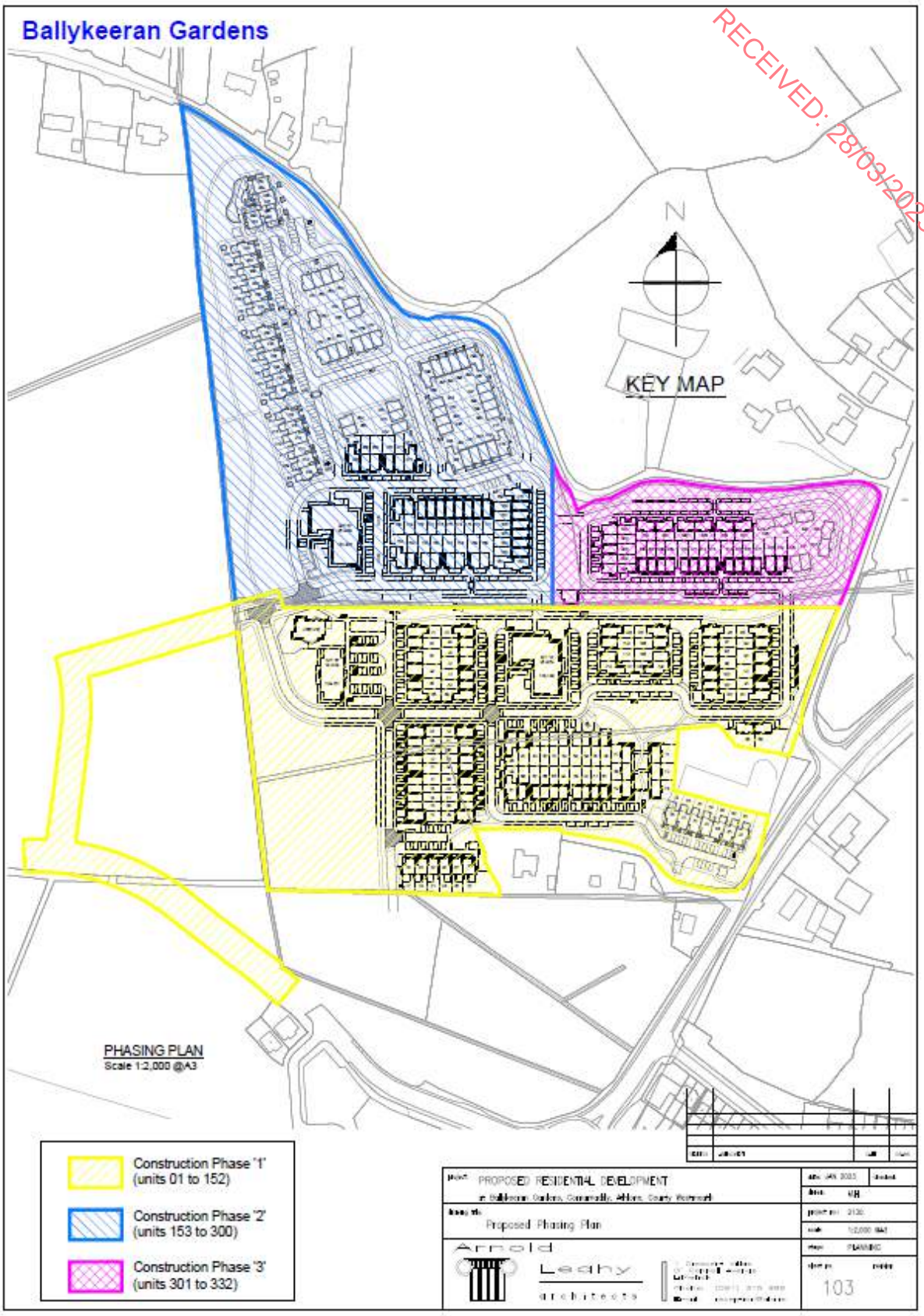

Figure 2-4 Phasing Plan (Arnold Leahy Architects, January 2023)

2.4.1 Construction Phase Sequencing

The sequencing of Construction Phase works is detailed in Table 2-1. This provides a schedule of the expected sequence of operations for the works to be completed during the Construction Phase.

Table 2-1 Sequence of Operations for the Construction Phase

No.	Sequence of Construction
1	Foundations excavation and formation level establishment
2.	Foundations: formwork and steel reinforcement installation
3.	Masonry Blockwork: including insulation installation
4.	Carpentry 1st fix: timber roof structure and coverings
5.	Window/Door installation
6.	Plastering (external)
7.	Painting (external)
8.	Internal services (electrical and plumbing)
9.	Plastering (internal)
10.	Floor: Sand and cement screed
11.	Services connection: electrical, sewage, telecoms.
12.	Painting (internal)
13.	Tiling: Floors, walls etc.
14.	Carpentry 2nd fix: doors, flooring etc.
15.	Landscaping
16.	Road finishes: Tarmacadam roads and parking areas

The operational hours for the site shall be 08:00 to 19:00 Mondays to Fridays and 08:00 to 14:00 Saturdays. No work is permitted on Sundays or public holidays. Deviation from these hours will only be allowed in exceptional circumstance with prior written approval from the planning authority (Construction Environmental Management Plan, EOBMS Consulting Engineers Ltd, February 2023).

2.5 Description of Alternatives

2.5.1 Introduction

Consideration of reasonable alternatives is an important aspect of the EIA process and is necessary to evaluate the likely environmental consequences of a range of development strategies for the site of the Proposed Development within the constraints imposed by environmental and planning conditions. This section provides a description of the reasonable alternatives that have been considered.

Article 5 of the EIA Directive requires that that the EIAR contain:

"*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*."

This section of the EIAR provides an explanation of the reasonable alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the Proposed Development, taking into account and providing a comparison of the environmental effects. The alternatives may be described at four levels:

- Alternative locations;
- Alternative designs;
- Alternative layouts; and
- Alternative processes

Pursuant to Section 3.4.1 of the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (*EPA, 2022*), the consideration of alternatives also needs to be cognisant of the fact that "*in some instances some of the alternatives described below will not be applicable - e.g. there may be no relevant 'alternative location'…*"

In accordance with EPA Guidelines (*EPA, 2022*), different types of alternatives may be considered at several key phases during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The EPA Guidelines (EPA, 2022) states:

"*The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required*."

The following sections of this chapter of the EIAR contains an analysis of the alternative development options for the site, describing design options and changes which were incorporated into the scheme as the proposals progressed. The key considerations and

amendments to the design of the scheme, having regard to and comparing the key environmental effects, are set out and discussed.

2.5.2 Alternative Locations

The Proposed Development is for the construction of a residential development. The Site is located within the functional area of the Athlone Town Development Plan 2014-2020 (ATDP). In terms of current zoning the lands have been designated under the plan as: proposed residential, existing residential and open space. In this context, the proposed residential units and creche are consistent with the zoning objective under the plan, however the access road and associated infrastructure works proposed in the open space are not permitted under the land-use zoning matrix. A Material Contravention Statement (Genesis Planning Consultants, February 2023) has been prepared for the Proposed Development. This Statement provides justification for the location of the access road and associated infrastructure works, in that access to the lands via the open space zoning is the only pragmatic option to deliver the residential scheme on the lands, given constraints gaining access to the National road network aligning the eastern boundary of the site. Also providing access via the western approach will effectively connect with the link road proposed under the adjacent scheme proposed under application 22/253 (Glenveagh lands), thereby maximising permeability between both schemes and the wider link road network proposed.

Having regard to the Athlone Town Development Plan 2014-2020 zoning objectives, it is not considered necessary to consider alternative sites for the Proposed Development. In addition, the Proposed Development is located in close proximity to areas zoned for employment. The location of the Proposed Development is ideal in providing much needed residential accommodation to the growing Midlands population.

2.5.3 Alternative Uses

If the Proposed Development is not advanced, the site will remain as greenfield parcel of land. In light of the zoning objectives for the Site of the Proposed Development, as well as the current demand for high quality residential units in a growing large town with a population greater than 5000, other land uses on site would not be considered appropriate alternatives or would not be in accordance with the planning policy context pertaining to the lands

Due to the nature of the current proposal, i.e., the development of residential dwellings and supporting community facilities including a childcare facility, it was not considered necessary to consider alternative uses for the Proposed Development.

2.5.4 Alternative Design and Layouts

The proposals for the subject lands were the subject of detailed discussions with the relevant authorities prior to the finalised scheme being prepared, which highlighted the environmental issues to be addressed to inform the design process. These considerations have informed the consideration of alternative layouts and designs, open space provision, addressing the issues of population and human health in a town environment, biodiversity, and road and access arrangements, up to the formalisation of the final scheme, as detailed in this planning application. The alternative designs and layouts considered during the preparation of the Proposed Development are discussed in further detail, as follows:

Draft 1; 2021

This layout (refer to Figure 2-5) incorporated an access onto the local road & then the National Road directly. Pre-planning discussions were held with the Council in 2021 and it was requested that the access and the overall layout had to be revised to achieve the following points:

- Access avoided onto the local road;
- Uplift in Density to achieve 35 p/ha (density of 25 p/ha too low & contrary to National Policy that seeks to achieve sustainable use of zoned lands); and
- A Masterplan layout that integrated the lands zoned as public open space & also created interaction with Marina Quarter Lands to the west.
- Avoid rear gardens facing onto local roads; active frontages required

Figure 2-5 Draft Design and Layout 1

Draft 2; July 2022.

This layout (refer to Figure 2-6) incorporated an access via the Link Road. No access was proposed onto the local road in order to avoid intensification in use of junction onto the National Road.

- The density was increased to 332 units to achieve 35 units p/ha along with a Creche;
- The layout was amended to relate to open space lands and neighbouring lands.
- Active frontages to all areas of the site were included;
- Cycle path to/from the site was included;
- Pocket park provisions & permeability achieved;
- SUDS was incorporated into the project design;
- The provision of a bus lay-by to facilitate future bus service was included; and
- A variety of building typologies and Character zones detailed in this draft version.

Figure 2-6 Draft Design and Layout 2

An LRD discussion took place on 5th August 2022. Figure 2-6 details the draft layout which was the basis on LRD discussions at this meeting. Key design and planning matters identified include the following:

- Development would be acceptable in principle; plan-led in terms of zoning and density of 35p/ ha deemed acceptable.
- Future connectivity to adjacent lands to south to be shown.
- The layout and design to respond to the wider masterplan context of the development.
- Provision of a cycle path through the core of the site and also pedestrian connectivity to eastern boundary of site.
- Emergency access be introduced from the east via collapsible bollards
- Pocket parks to be incorporated into the layout to avoid over-reliance on linear park to the west.
- The streetscape design justification is to be demonstrated how building typologies relate to each other.
- Height strategy for the layout to be demonstrated in a design statement.
- Permeability of the layout to be demonstrated & placemaking.
- A need to restrict car parking provision to 1 space per unit to encourage sustainable travel modes.
- Consideration to be given to incorporating a bus lay-by within the site for a future local bus service.
- SUDS and drainage strategy to be factored into the layout.
- Encouraged an uplift to achieve 100% EV charge point infrastructure provision rather than 10% as in CDP and the design.

Following a number of iterations to the site layout, the final site layout and design was prepared in February 2023 (Figure 2-7) shown below.

Figure 2-7 Final Layout

This layout incorporated an access via the Link Road. No access is proposed onto the local road, in order to avoid intensification in use of the junction onto the National Road. The density increased to 332 units to achieve 35 units p/ha along with a creche.

The layout was amended to relate to open space lands and neighbouring lands. Full pedestrian and cyclist connections are also incorporated into the design. The Masterplan scenario is incorporated into the layout demonstrating how future zoned lands adjacent to the Proposed Development can be developed for a School.

A cycle path to/from the site is included; this is DMURS(Design Manual for Urban Roads and Street) compliant road layout. There is a restriction on parking provision at 1 space per unit to encourage sustainable local journeys by bike/walking. Pocket Park provisions and permeability is achieved; SUDS is incorporated into the final design. The layout and design include for provision of a bus lay-by to facilitate future bus service to the development site. This final layout includes for a variety of building typologies and Character zones, as well as the provision of a creche.

2.5.5 Alternative Process

Due to the nature of the current proposal, i.e., the development of residential dwellings and supporting community facilities including childcare, it was not considered necessary to consider alternative processes for the Proposed Development.

2.6 The Existence of the Project

The primary likely significant environmental impacts of the Proposed Development are fully addressed in the relevant specialist Chapters of this EIAR. These impacts relate to Population and Human Health, Land and Soil, Hydrology and Hydrogeology, Landscape and Visual, Noise, Air Quality and Climate, Traffic, Built Services and Waste Management.

The Proposed Development will result in an increase in the local population, and it will have a positive impact on the long-term supply needs of housing in the greater Westmeath area. The Proposed Development includes a creche, which will create employment in the local area and will also provide much needed care services for children. Additionally, the open spaces provided in the Proposed Development will create habitable, quality spaces which will have a positive impact on the health and well-being of current and future local residents.

The Proposed Development also has the potential for cumulative, secondary and indirect impacts, which in many instances can be difficult to quantify due to complex inter-relationships. The potential cumulative impacts primarily relate to traffic, dust, noise and other nuisances from the Construction Phase of the Proposed Development, with other planned or existing projects, and each of the technical EIAR chapters have regard to these in the assessment and mitigation measures proposed.

All cumulative, secondary and indirect impacts are unlikely to be significant and have been fully addressed in the relevant specialist Chapters of this EIAR and recapitulated in Chapter 14 (Interactions). As such, with the necessary mitigation for each environmental aspect, it is anticipated that the potential cumulative impact of the Proposed Development in conjunction with the other planned and permitted developments adjoining the site of the Proposed Development will be minimal.

3 PLANNING AND POLICY

The planning and policy context gives an overview of the relevant legislation that supports the Proposed Development at a local, regional and national level, and sets out the strategic and statutory context governing the planning and development of the proposed development.

The following sections describe how the Proposed Development complies with the stated and statutory requirements of Westmeath County Council (WCC) with respect to planning and sustainable development. The relevant local planning policy with which the Proposed Development complies primarily comprises the Westmeath County Development Plan 2021-2027. The Proposed Development falls under the definition of LRD as set out under Section 2 of the Section 2 of the 2021 Act as it is a development '*of 100 or more houses on land zoned for residential use…'*. In summary the Proposed Development provides for 332 no. residential units and crèche on lands zoned 'proposed residential' and 'existing residential' in the Athlone Town Development Plan 2014-2020.

3.1 Quality Assurance and Competence

This Chapter of the EIAR was prepared by Senior Environmental Consultant Mairéad Foran. Mairéad Foran has a B.A. (Moderatorship) in Environmental Sciences from Trinity College Dublin, and an Advanced Diploma in Planning and Environmental Law from King's Inns College, Dublin. Mairéad has over 4 years professional experience as an Environmental Consultant and has experience working on a large number of EIARs and EIA Screening Reports for projects of a similar scale to that of the Proposed Development.

3.2 National and Regional Planning Policy Context

3.2.1 National Planning Context

3.2.1.1 National Framework Plan

The *Project Ireland 2040: National Planning Framework* (NPF), published on 16th February 2018, replaces the previous National Spatial Strategy. It is the Government's high-level strategic plan for shaping the future growth of the country to the year 2040. It will guide public and private investment and create and promote opportunities for people, and to protect and enhance the environment.

The NPF outlines key future planning and development place making policies for the Eastern and Midland Regions, including a major new policy emphasis on renewing and developing existing settlements with the target of achieving at least 40% of all new housing to be delivered within the existing built-up areas of cities, towns and villages on infill and/or brownfield sites, such as the subject site.

The National Strategic Outcomes as set out in the NPF are:

- Compact Growth;
- Enhanced Regional Accessibility;
- Strengthened Rural Economies and Communities;

- High-Quality International Connectivity;
- Sustainable Mobility;
- A Strong Economy, supported by Enterprise, Innovation and Skills;
- Enhanced Amenities and Heritage;
- Transition to a Low Carbon and Climate Resilient Society;
- Sustainable Management of Water, Waste, and other Environmental Resources; and
- Access to Quality Childcare, Education and Health Services.

The NPF - Project Ireland 2040 requires delivery of a baseline of 25,000 homes annually to 2020, followed by a likely level of 30-35,000 annually up to 2027. To achieve the objective of compact growth, 40% of future housing delivery is to be delivered within and close to the existing built-up areas. Under the NPF Athlone is recognised as a regional centre and is targeted for growth and investment as a key driver for the midland region

National Policy **Objective 4** in this regards states:

'*Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being*.'

The Proposed Development supports and assists in achieving the following objectives:

National Policy **Objective 11** in this regards states:

'In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth.'

National Policy **Objective 13** in this regards states:

'*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*.'

The NPF also includes the following objective in relation to social infrastructure needs:

National Policy **Objective 33**:

Prioritise the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.

As defined in the NPF, ideally future homes will be located in places that can support sustainable development - places which support growth, innovation and the efficient provision of infrastructure, are accessible to a range of local services, can encourage the use of public transport, walking and cycling, and help tackle climate change.

The Proposed Development supports the polices and goals outlined in the NPF. The development is located in an area well served by the necessary infrastructure, and which is zoned specifically for uses of this nature.

Further details on how the Proposed Development supports and complies with planning policy and legislation are detailed in the Planning Statement by Genesis Planning Consultants and submitted separately as part of this application. A Material Contravention Statement (Genesis Planning Consultants, February 2023) has also been prepared for this application.

3.2.1.2 Sustainable Urban Housing: Design Standards for New Apartments (2018, 2020 and 2022)

The Sustainable Urban Housing: Design Standards for New Apartments guidelines update the previous version that was published in 2015. These Guidelines promote sustainable living patterns with the objective to curb urban sprawl. The Proposed Development has been designed to these current standards.

3.2.2 Urban Development and Building Heights Guidelines for Planning Authorities (2018)

The Urban Development and Building Heights – Guidelines for Planning Authorities, set out national planning policy guidance on building heights with regard to urban areas. The Guidelines supports the strategic policy framework set out in Project Ireland 2040 through the strengthening of policies for consolidation of existing built-up areas, rather than an unsustainable pattern of development whereby many cities and towns continue to grow outwards.

In relation to individual Planning Applications the Guidelines identify that there is a presumption in favour of buildings of increased height in our town/city cores and in other urban locations with good public transport accessibility. In addition, Guidelines set out national planning policy that '*Applies those requirements in setting out relevant planning criteria for considering increased building height in various locations but principally (a) urban and city-centre locations and (b) suburban and wider town locations*.' The Guidelines seek to secure '…*compact and sustainable urban growth'* which means '..*either reusing or redeveloping existing sites and buildings, in well serviced urban locations, particularly those served by good public transport and supporting services, including employment opportunities'*.

The height range in the Proposed Development graduates from 2 storey housing and 3 - 4 storey apartment buildings. Given the proposed scheme includes heights in excess of 3 storeys and it is not located within the Athlone Town Development Plan 2014-2020 (ATDP) building height policy area then it may be considered the proposal is a Material Contravention of the ATDP, as well as the Urban Development and Building Heights Guidelines for Planning Authorities (2018).

In accordance with the Section 28 guidelines 'Urban Development and Building Height Guidelines for Planning Authorities' it is a requirement under SPPR4 for the proposal to provide a mix of building heights and typologies.

In this context, it is submitted that the proposed building heights are acceptable, with a justification also provided under the Material Contravention Statement by Genesis Planning Consultants (February 2023), provided under separate cover.

3.2.3 Housing for All - A New Housing Plan for Ireland (2021)

Housing for All - a New Housing Plan for Ireland' is the government's housing policy to 2030. It is a multi-annual, multi-billion-euro plan which will improve Ireland's housing system and deliver more homes of all types for people with different housing needs.

The overall aim of Housing for All states: "*Everyone in the State should have access to a home to purchase or rent at an affordable price, built to a high standard and in the right place, offering a high quality of life*." Housing for All provides four pathways to achieving four overarching objectives:

- *"Supporting Homeownership and Increasing Affordability;*
- *Eradicating Homelessness, Increasing Social Housing Delivery and Supporting Social Inclusion;*
- *Increasing New Housing Supply; and*
- *Addressing Vacancy and Efficient Use of Existing Stock."*

To meet the targets as set out in the National Planning Framework and the measures discussed in the Housing Plan, Ireland needs an average of 33,000 homes constructed per annum until 2030.

The Proposed Development will contribute to the number of residential homes being constructed and will assist in achieving the Housing Policy Objectives outlined in the Plan. The Government's *Housing for All Plan* as well as the policies outlined in the National Planning Framework support the delivery of residential development, such as that proposed. The Proposed Development is located in close proximity to quality public transport routes (in the context of local connections serving the north Athlone Environs the site is well placed in terms of local connections for a residential development) and within an existing urban area.

3.2.2 Design Manual for Urban Roads & Streets (DMURS) (May 2019)

The Design Manual for Urban Roads & Streets (DMURS) has been prepared for the Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government and sets out design guidance and standards for urban roads/streets in Ireland. It also outlines practical design measures to encourage more sustainable travel patterns in urban areas. The Planning Statement (Genesis Planning Consultants), DMURS Street Design Audit and DMURS Compliance Statement (EOBMS Consulting Ltd, 15th February 2023) provides further detail in respect of the compliance of the Proposed Development with this Design Manual.

3.2.3 National Policy Position on Climate Action & Low Carbon Development and the Climate Action Plan

The EU, in 2014, agreed the "2030 Climate and Energy Policy Framework" (EU 2014). The European Council endorsed an EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The Paris Agreement was established in 2015 and is an important milestone in terms of international climate change agreements. In order to meet the objectives of the Paris Agreement, and to assist in reducing Ireland's GHG emissions, the Irish government has established and outlined several policies at a national level.

In 2014, the Government adopted the National Policy Position on Climate Action and Low Carbon Development. The Climate Action and Low Carbon Development Act 2015 was adopted to provide for the approval of plans by the government in relation to climate change. This Act establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out the context for the objective, clarifies the level of greenhouse gas (GHG) mitigation ambition envisaged and establishes the process to pursue and achieve the overall objective. Specifically, the Policy Position envisages that policy development will be guided by a long-term vision based on:

- An aggregate reduction in carbon dioxide (CO2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and
- In parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The National Mitigation Plan (DCCAE, 2017) and the National Adaptation Framework (DCCAE, 2018) were also established under this Act.

In addition, on Thursday 4th November 2021, the government launched the Climate Action Plan 2021, an ambitious plan to put Ireland on a more sustainable path, cutting emissions, creating a cleaner, greener economy and society and protecting us from the devastating consequences of climate change.

The Climate Action Plan follows the Climate Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. These targets are a key pillar of the Programme for Government. By 2030, the government aims to achieve the following:

- Cutting greenhouse gas emissions by at least 30%
- Reaching a target of at least 32.5% energy efficiency
- Delivering 70% renewable electricity

In response, the Proposed Development is compliant with the objectives of the National Policy Position on Climate Action and Low Carbon Development as the development will incorporate A2 rated buildings and incorporate technologies to minimise impacts on climate change.

Further information is available within the Building Lifecycle Report (Balrath Engineering, February 2023) (Appendix I). This includes low energy technologies considered for the Proposed Development, including ECAR charging points, Exhaust Air heat pumps, Central extract/demand-controlled ventilation and Air Source Heat Pumps. An Energy and Sustainability Report (Balrath Engineering Consultants, 25th January 2023) has also been prepared as part of this application.

3.2.3.1 The Planning System & Flood Risk Management (2009)

The Planning System and Flood Risk Management Guidelines were issued under Section 28 of the Planning & Development Act 2000 (as amended). The Planning System and Flood Risk Management Guidelines require the planning system at all levels to avoid development in

areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere; adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk; and incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

A Site-Specific Flood Risk Assessment (SSFRA) has been prepared in accordance with these guidelines by EOB Management Services and is enclosed with the planning application.

3.2.3.2 Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities, 2009 and Urban Design Manual, A Best Practice Guide

The Sustainable Residential Development in Urban Areas guidelines detail the key principles for new residential developments in urban areas while its accompanying Urban Design Manual translates the Guidelines into practice. The Guidelines encourage increased densities in appropriate zoned residential land within inner suburban areas of cities, proximate to existing and due to be improved public transport corridors.

As stated in the Planning Statement (Genesis Planning Consultants) the site layout as proposed will provide for a hierarchy of spaces, home-zones and unit types which will create a high-quality residential environment. In terms of context the proposed net density of 35 units per hectare is appropriate and consistent with the guidelines and the open space provision of 17.68% of the overall site area which meets and exceeds the requirements set down under the guidelines.

3.2.3.3 Urban Design Manual (A Best Practice Guide) (2009)

The Urban Design Manual was published as a companion document to the Guidelines for Sustainable Residential Development in Urban Areas. The Manual is intended to assist in the assessment of residential applications, to identify the principles and criteria that are important in the design of housing and to set out a design framework for a new residential neighbourhood. These guidelines are also incorporated in the relevant development plan and/or local area plans and outline key considerations in planning application assessments.

The Manual sets out 12 key urban design criteria that all new residential developments should be tested against, in order to establish if the scheme is a well-designed proposal including Context, Connections, Inclusivity, Variety, Efficiency, Distinctiveness, Layout, Public Realm, Adaptability, Privacy / Amenity, Parking and Detailed Design.

In accordance with the Guidelines, the Proposed Development has been assessed against these criteria by Arnold Leahy Architects within the Design Statement that is included as part of the planning application.

3.2.3.4 National Investment Framework for Transport in Ireland (NIFTI)

The National Investment Framework for Transport in Ireland (NIFTI) sets out clear principles for the consideration of future transport investment and is closely aligned with key Government policy priorities and commitments, such as the Climate Action Plan and the National Development Plan.

The strategic investment priorities articulated by NIFTI have been developed to support the realisation of the NPF and address key transport challenges identified through extensive supporting analysis. The four NIFTI priorities for future land transport investment are:

- Decarbonisation;
- Protection and Renewal;
- Mobility of People and Goods in Urban Areas; and
- Enhanced Regional and Rural Connectivity.

The Proposed Development aligns with the principles as set out by NIFTI. In particular, the Proposed Development assists in achieving one of the key outcomes of the NPF – Compact Growth.

3.2.4 Regional Planning Context

3.2.4.1 Eastern & Midland Regional Assembly - Regional Spatial & Economic Strategy (2019)

The Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031 (hereafter RSES) were adopted in 2019 to ensure the policies and objectives of the NPF are implemented at a regional level.

In line with the National Planning Framework, Athlone is recognised by the Regional Spatial and Economic Strategy for the Northern and Western Region (RSES 2018) as a regional growth centre. It is recognised by the RSES that regional growth centres are:

'*large towns with a high level of self-sustaining employment and services that act as regional economic drivers and play a significant role for a wide catchment area*'.

In terms of the development strategy outlined in the RSES it echoes the NPF in that it states:

'*Facilitating housing is paramount to ensuring the sustainability, vitality and viability of the rural places of the Region. Support for housing and population growth within rural towns and villages will help to act as a viable alternative to rural one-off housing, contributing to the principle of compact growth*.'

The Proposed Development has been designed in accordance with the above guidelines, and objectives of the NPF and the RSES.

3.2.5 Local Level

3.2.5.1 Westmeath County Development Plan 2021-2027 & Athlone Town Development Plan 2014-2020

The Westmeath County Development Plan is the statutory planning policy document for the County and sets out the policies and objectives for the proper planning and sustainable development of the County from 2021 to 2027.

The subject lands are located within the functional area of the Athlone Town Development Plan 2014-2020 (ATDP). The application site is zoned Proposed Residential, Existing Residential and Open Space, with the Residential Objective to "*To provide for residential development, associated services and to protect and improve residential amenity*" and the

Open Space Objective "*To provide for, protect and improve the provision, attractiveness, accessibility and amenity value of public open space and amenity areas*".

As set out in the Planning Statement (Genesis Planning Consultants), the proposed residential units and creche are consistent with the zoning objective under the plan, whilst the access road and associated infrastructure works proposed in the open space are not permitted under the land-use zoning matrix. Therefore, a Material Contravention Statement accompanies this planning application which sets out the justification of the proposal when considered in the wider spatial and planning policy context. The Material Contravention Statement outlines the following justification for this zoning, as follows:

"In order to gain access to the lands the design rationale proposes the road network to pass through this area of the site zoned as open space, given road constraints to the east via the existing junction and National Road do not permit intensification or direct access to the lands from the eastern side.

Under the ATDP zoning matrix (chapter 13) it is noted such infrastructure works are not listed as either permitted or open for consideration. Further section 13.2.7 of the ATDP states 'Only development that is incidental to, or contributes to the enjoyment of open space, amenity or recreational facilities will be permitted within this zone.'

In terms of justification for this aspect of the project we submit access to the lands via the open space zoning is the only pragmatic option to deliver the residential scheme on the lands, given constraints gaining access to the National road network aligning the eastern boundary of the site.

Also providing access via the western approach will effectively connect with the link road proposed under the adjacent scheme proposed under application 22/253, thereby maximising permeability between both schemes and the wider link road network proposed."

3.2.5.1.1 Policy in relation to Residential Development

The NPF sets the policy parameters for the Eastern and Midlands Region to better manage the growth of Dublin as a city of international scale supported by the growth of the three key Regional Centres of Athlone, Dundalk and Drogheda. These settlements also form the upper two tiers in the settlement hierarchy presented in the RSES. Regional Growth Centres, as they are referred to in the RSES, are 'large towns with a high level of self-sustaining employment and services that act as regional economic drivers and play a significant role for a wide catchment area'. Athlone's strategic location in the centre of Ireland is acknowledged in the strategy, with reference made to its position as a key node between Dublin and Galway on the River Shannon.

It is the policy of the County Development Plan to:

CPO2.2 *Support the continued growth of Athlone, with a focus on quality of life and securing the investment to fulfil its role as a key Regional Growth Centre and economic driver in the centre of Ireland, with a target population of 30,000 up to 2031;*

CPO2.13 *Ensure that the future spatial development of Westmeath is in accordance with the National Planning Framework 2040 (NPF) including the population targets set out under the Implementation Roadmap, and the Regional, Spatial and the Economic Strategy (RSES) for the Eastern and Midland Region 2019-2031; and*

CPO2.17 *Support the regeneration of underused town centre and brownfield / infill lands along with the delivery of existing zoned and serviced lands to facilitate population growth and achieve sustainable compact growth targets of 30% of all new housing to be built within the existing urban footprint of targeted settlements in the County.*

The Proposed Development will assist in achieving the objectives as set out in the Development Plan.

4 POPULATION AND HUMAN HEALTH

4.1 Introduction

This Chapter of the EIA Report considers the potential effects of the Proposed Development on human beings, living, working and visiting in the vicinity of the Site. The Chapter details the potential direct and indirect effects of the Proposed Development on population and human health.

The section on Population and Human Health is broad ranging and covers the existence, wellbeing, and activities of people through the format of considering people as 'groups' or 'populations'. The assessment of impacts on human beings involves the identification of relevant key populations that may be affected by the proposal and quantifiable documentary research. Health, as defined by the World Health Organization (WHO), is *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"*.

Key populations have been identified as persons residing and engaging in activities near the application site, persons with a stake in the general economy of the local and regional area, and persons enjoying the recreational and cultural amenities of the area.

4.1.1 Quality Assurance and Competence

This Chapter was prepared by Louise Hewitt, Environmental Consultants, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction, Population and Human Health and Archaeology and Cultural Heritage Chapters of EIARs.

4.2 Study Methodology

A desk-based study was undertaken in January 2023 to assess information regarding population, age structure, economic activity, employment, and unemployment within the vicinity of the Proposed Development. This study was undertaken in accordance with the following guidance:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA (2022)

Technical Chapters within the EIAR have also been reviewed when assessing the likely effects on population and human health. These include the relevant Chapters relating to air quality, noise and vibration, hydrology, traffic and transport and landscape and visual.

The 2022 Census of Ireland was held on Sunday the 3rd of April 2022. The preliminary results were released on the 23rd of June 2022 however the main results will be published over several months starting in April 2023. The preliminary 2022 census results have been reviewed however they do not contain the required region-specific information for the purpose

of this assessment of demographic profile. As such, the more robust and complete 2016 census results have been used in this assessment (Accessed January 2023). The remaining information analysed as part of the desktop study was accessed in June 2022. The scope of the evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and EIARs. The aim of the study was to assess the current baseline environment.

The scope of the evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and EIARs. The aim of the study was to assess the current baseline environment.

The potential Impact of the Proposed Development on the local population is assessed in this EIAR in relation to:

- Population;
- Socio Economic impacts;
- Tourism and Amenity;
- Air quality;
- Water;
- Noise;
- Traffic; and
- Risk

4.2.1 Study Area

The Proposed Development is located in the Moydrum Electoral Division (ED). This assessment on Population and Human Health has taken other reports prepared as part of this planning application into account when selecting an appropriate study area, namely the Schools and Childcare Assessment, Planning Statement and Statement of Housing Mix (Genesis Planning Consultants, 2023). For the most thorough assessment, which is cognisant of the aforementioned reports, the following ED's have been selected as the study area (Figure 4-1)

- Moydrum ED;
- Athlone East Rural ED;
- Athlone West Rural ED;
- Athlone East Urban ED; and
- Athlone West Urban ED.

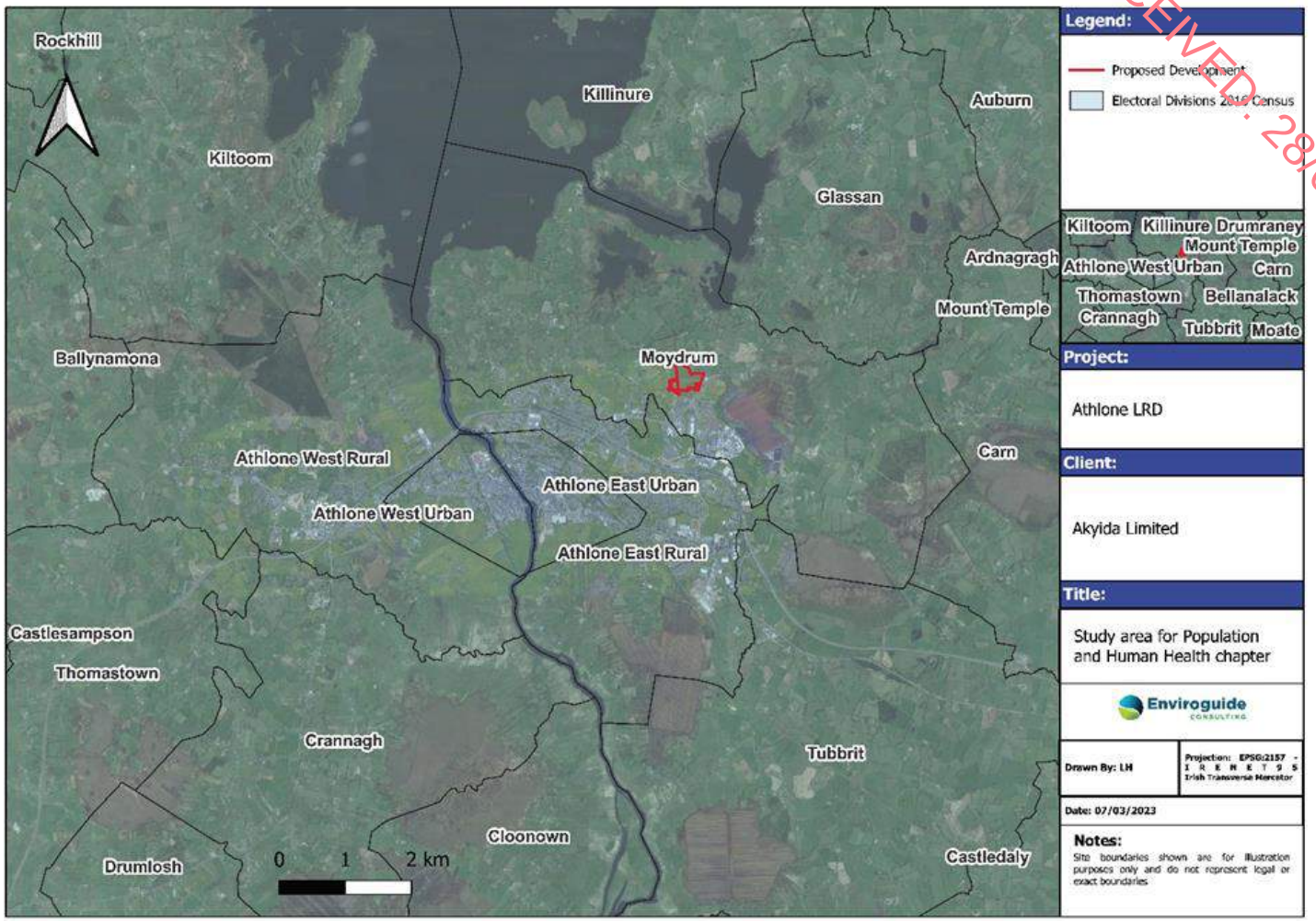

Figure 4-1: Map of Study Area including Moydrum ED and Athlone Urban and Rural EDs (Site location marked in red)

4.2.2 Information Sources

The principal sources of information are as follows.

- Census and employment information published by the Central Statistics Office (CSO). Available at https://data.cso.ie/
- Westmeath County Development Plan 2021-2027
- Ordinance Survey Ireland (OSI) mapping and aerial photography

The Institute of Public Health in Ireland has issued a document "*Health Impact Assessment Guidance*" (2021) which details the link between human health and the built environment (Figure 4-2). This document also details the negative health impacts associated with unemployment. Unemployment affects both physical and mental health and is an important determinant of health inequalities in adults of working age. Unemployed people have a higher risk of lower levels of psychological wellbeing ranging from symptoms of depression and anxiety to self-harm and suicide. Unemployment can also impact other health determinants for example housing and nutrition. Based on this information, employment generated as a result of the Proposed Development has been assessed throughout this chapter.

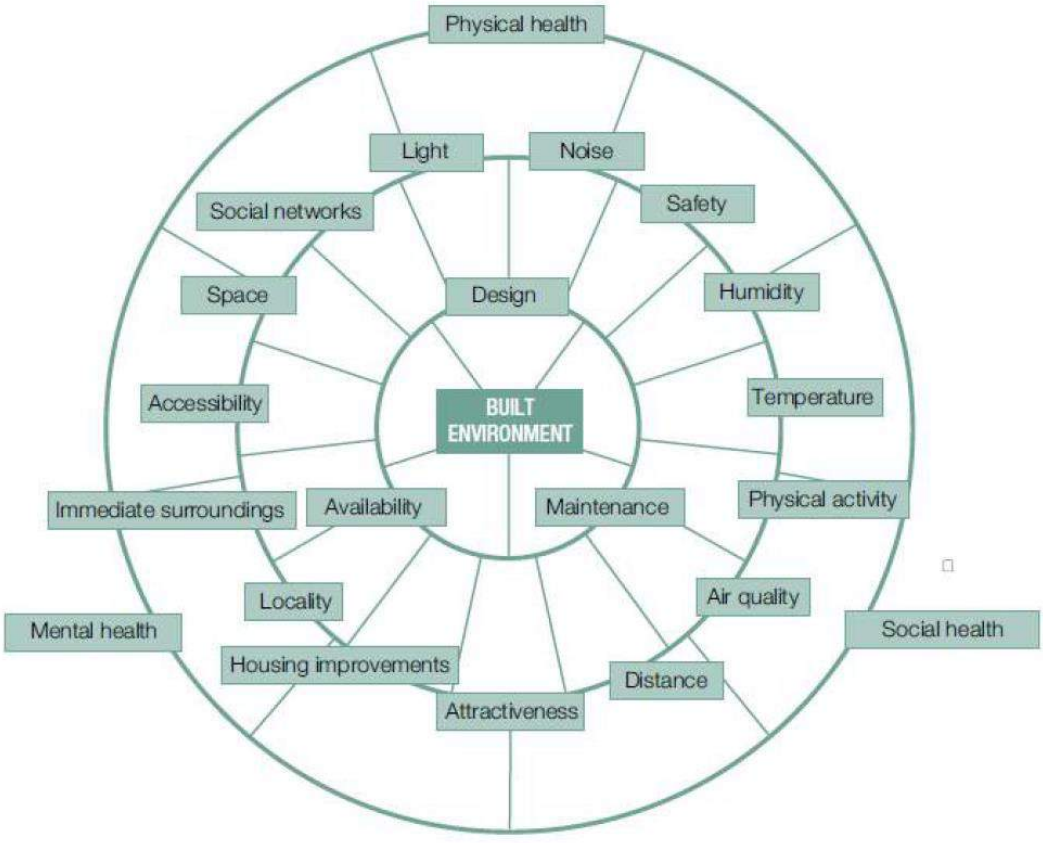

Figure 4-2: Health impact of the built environment (source: Institute of Public Health in Ireland)

The European Commission (EC) has published the "*Guidance on The Preparation Of The Environmental Impact Assessment Report*" (EC, 2017). This document defines human health

as "*a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air".*

The following reports submitted as part of this planning application have also been consulted:

- Schools, Childcare and Social Infrastructure Assessment;
- Planning Statement;
- Inward Noise Impact Assessment; and
- Daylight and Sunlight Assessment.

In line with the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) (the EPA Guidelines (EPA, 2022)), the following terms are defined when quantifying the quality of effects. See Table 4-1.

Table 4-1: Definition of Quality of Effects

Quality	Definition
Positive Effects	A change which improves the quality of the environment
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

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the significance of impacts. See Table 4-2.

Table 4-2: 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 4-3.

Table 4-3: 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.

4.3 The Existing and Receiving Environment (Baseline Situation)

The Proposed Development is located in the northern environs of Athlone. The Site is to the northwest of the N55 and is currently accessed by the L8048 with high accessibility by foot, bicycle, and car. The Proposed Development includes the construction of a new link road. The site is currently a greenfield site with surrounding land use comprised of residential, commercial, and civic land use.

The site is located within the functional area of the Athlone Town Development Plan 2014-2020 (ATDP) and is zoned as:

- Proposed residential;
- Existing residential; and
- Open space (Refer to Figure 4-3).

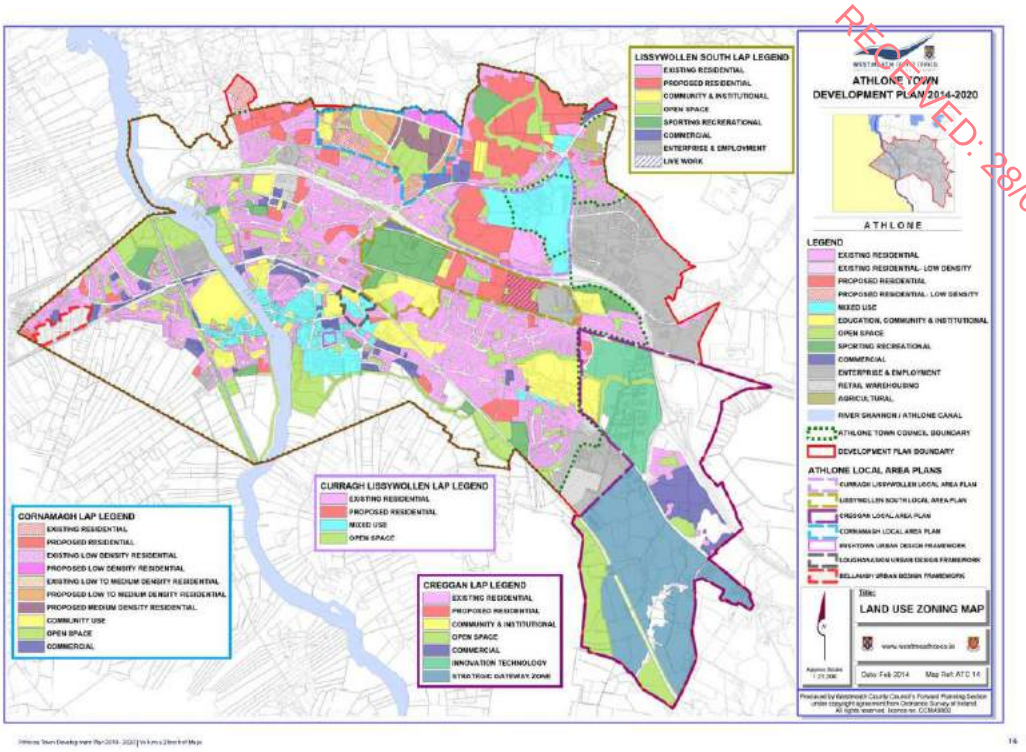

Figure 4-3 Land Use Zoning Athlone Town Development Plan 2014-2020

4.3.1 Population and Demographic Analysis

In terms of the Locality, County and State, population structure and change are more strongly influenced by migration and emigration rates than by birth and death rates. The mid to late 1980s in Ireland was a period of heavy population outflow, mainly due to the poor economic and employment situation in the country at that time.

The most recent population estimates (January 2023) published by the Central Statistics Office indicate that the combination of a net inward migration and high birth rates have resulted in the population of Ireland has exceeded 5 million for the first time since 1851. Population projections for Ireland up to 2046 anticipate a population of approximately five million under the most pessimistic scenario and over 6.7 million under the most optimistic scenario. Population projections for Northern Ireland up to 2034 anticipate a population of approximately two million.

Population values for 2022 are currently available at a county and state-wide level. The population of Westmeath has increased by 7.96% from 2016-2022 (Table 4-4). As part of Project Ireland 2040, the Department of Housing, Planning and Local Government has estimated population projections for each region and county of Ireland. Based on these projections the population of Westmeath will 96,500-98,500 in 2026 and 100,000-102,500 in 2031 (rounded to the nearest 500 persons) (Source: NPF Implementation Roadmap – July 2018- DoHPLG).

Table 4-4 Population Statistics for County Westmeath in 2016 and 2022 (CSO)

Area	2016	2022	Population Change
Westmeath	88,770	95,840	+7.96%

4.3.2 Population and Age

The social and community needs are assessed based on consideration of the existing and potential population growth and best practice provision. Of most relevance to the Proposed Development are the Census data on population numbers and structure relating to the Electoral Divisions of Moydrum and Athlone ED (See Section 4.2.1 for study area).

Table 4-5 shows the breakdown of the population of Muinebeag based on their age range during the 2016 Census against the County Carlow and State averages. This table is further broken down into percentages of the population within these age ranges. As evident from Table 4-5, the population demographics for the study area and County Westmeath are generally in line with those for the State.

Children aged 0-4 years make up 7.76% of the population which is slightly higher than the average for County Westmeath (7.28%) and the State (6.96%).

People aged 5-24 years make up the largest age group in the study area representing 26.62% of the population which is in line with the averages for County Westmeath and the State of Ireland.

There are more people in the study area aged 25-34 (17.50%) than County Westmeath (13.13%) and the State (13.85%).

People aged 35-44 (15.86%), 45-54 (11.33%), 55-64 (9.26%) and 65-69 (3.83%) in the study area are in line with those for County Westmeath and the State and vary by a maximum of +/- 2%.

People in the study area aged 70 years and over (7.85%) is slightly lower than the average for County Westmeath (8.54%) and the State (8.95%).

Table 4-5: Population Categorisation by Age for Moydrum and Athlone EDs, County Westmeath and the State

Age Range	Moydrum and Athlone EDs		Westmeath		Ireland	
	No. of People	% of Peo-ple	No. of People	% of Peo-ple	No. of People	% of People
0-4 years	1,792	7.76	6464	7.28	331,515	6.96
5-24 years	6,149	26.62	24307	27.38	1,251,489	26.28
25-34 years	4,042	17.50	11657	13.13	659,410	13.85
35-44 years	3,663	15.86	13446	15.15	746,881	15.68
45-54 years	2,617	11.33	12022	13.54	626,045	13.15
55-64 years	2,140	9.26	9504	10.71	508,958	10.69
65-69 years	885	3.83	3787	4.27	211,236	4.44
70 years and over	1,814	7.85	7583	8.54	426,331	8.95
Total	**23,102**		**88,770**		**4,761,865**	

4.3.3 Economic Activity and Employment

The labour force is defined as the number of people above the legal working age that are available to work. The labour force participation rate is the number of people who are employed and unemployed but looking for a job, divided by the total working-age population.

In 2016, there were 2,304,037 persons in the labour force in Ireland. This represented an increase of 71,834 (3.2%) on 2011 statistics. The substantial increase in retired persons (up 19.2% to 545,407) has impacted on the labour force participation rate, which fell to 61.4%.

Table 4-6 shows the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. This figure is further broken down into the percentages that were at work or unemployed. It also shows the percentage of the total population aged 15+ who were not in the labour force, i.e., those who were students, retired, unable to work or performing home duties.

When assessing the percentage of people in the labour force it is noted that 61.1% of people in the study area are in the workforce. This reflects a high number of people working in the area and is in line with the average for County Westmeath (60.8%) and the State (61.4%).

The number of people who are retired in the study area is 13.6% which is in line with the average for County Westmeath (13.9%) and the State (14.5%).

Table 4-6: Economic Status of the Population Aged 15+ in 2016 (Source: CSO)

	Status	Moydrum and Athlone EDs		Westmeath		Ireland	
% of population aged 15+ who are in the labour force		**No. of People**	**% of People**	**No. of People**	**% of People**	**No. of People**	**% of People**
% of which are:	Persons at work	9181	50.5	35,194	51.0	2,001,953	53.3
	Assisting relative	233	1.3	95	0.1	4,688	0.1
	Unemployed	1685	9.3	6,666	9.7	297,396	7.9
Total number of people in the labour force		**9,414**	**61.1**	**41,955**	**60.8**	**2,304,037**	**61.4**
% of population aged 15+ who are not in the labour force		**No. of People**	**% of People**	**No. of People**	**% of People**	**No. of People**	**% of People**
% of which are:	Student or pupil	2210	12.2	7854	11.4	427,128	11.4
	Looking after home/family	1323	7.3	6073	8.8	305,556	8.1
	Retired	2476	13.6	9605	13.9	545,407	14.5
	Unable to work due to permanent sickness or disability	827	4.6	3077	4.5	158,348	4.2

	Status	Moydrum and Athlone EDs		Westmeath		Ireland	
	Others not in labour force	233	1.3	431	0.6	14,837	0.4
Total number of people not in the workforce		**7,069**	**38.9**	**27,040**	**39.2**	**1,451,276**	**38.6**
All persons aged 15 years and over		**18168**		**68995**		**3,755,313**	

The closest social welfare office to the Proposed Development which has figures available for the number of people on the Live Register / Unemployed is Athlone Intreo Centre which is located centrally within the study area. The monthly unemployment release contains a series of monthly unemployment rates and volumes. These series are based primarily on the Labour Force Survey and are compiled in accordance with agreed international practice. These statistics are the definitive measure of monthly unemployment. The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit or Jobseekers Allowance or for various other statutory entitlements at local offices of the Department of Social Protection. Table 4-7 details the most recent information available (February 2023) from the CSO from August to January 2023 on the number of persons on the Live Register.

Table 4-7: Number of people on the live register

Month	August 2022	Septembe r 2022	October 2022	November 2022	December 2022	January 2022
Number of Persons on Live Register (Athlone)	1804	1720	1716	1773	1784	1777

4.3.4 Travel and Commuting

Based on CSO Census information, an assessment of commuter times, duration and means of travel are summarised for the LEA in Tables 4-8 to 4-10.

The most popular time to leave home is between 08:31 and 09:00 with 25.59% of people commuting at this time. The second most popular time is between 08:01 and 08:30 with 18.63% of people commuting. Only 23.89% of people leave home before 08:00 a further 24.73% of people leave home after 09:00 (Table 4-8).

Table 4-8: Time Leaving Home in the study area

Time of Travel	No. of People in Moydrum and Athlone EDs (Total)	Percentage of People
Before 06:30	496	3.54
06:30 - 07:00	686	4.90
07:01 - 07:30	719	5.14
07:31 - 08:00	1444	10.31
08:01 - 08:30	2608	18.63
08:31 - 09:00	3583	25.59
09:01 - 09:30	2126	15.19
After 09:30	1335	9.54
Not stated	1003	7.16
Total	**14000**	

A total of 6,995 people (49.96%) of people commute to work or school for less than 15 minutes. In total, three quarters of people in the study area spend less than 30 minutes commuting each day (75.46%). Only 14.95% of people commute for longer than half an hour. (Table 4-9). This indicates that most people in the study area are not commuting long distance to work or school and Athlone provides access to sufficient services, employment, and amenities within the town, as most residents can access such amenities within a ½ time frame.

Table 4-9: Duration of Commute in study area

Duration of Journey	No. of People in EDs (Total)	Percentage of People
Under 15 mins	6995	49.96
1/4 hour - under 1/2 hour	3570	25.50
1/2 hour - under 3/4 hour	1033	7.38
3/4 hour - under 1 hour	291	2.08
1 hour - under 1 1/2 hours	378	2.70
1 1/2 hours and over	391	2.79
Not stated	1342	9.59
Total	**14000**	

Table 4-10 shows that the most popular means of travel in the study area is by car with a total of 61.62% utilising this means of travel (40.71% as a driver and 20.91% as a passenger) followed by On Foot (15.57%) and Bus, Minibus or Coach (8.42%).

Table 4-10: Means of Travel in the study area

Means of Travel	No. of People in Moydrum and Athlone EDs (Total)	Percentage
Car Driver	5779	40.71
Car passenger	2969	20.91
On Foot	2210	15.57
Bus, minibus or coach	1196	8.42
Not stated	917	6.46
Van	412	2.90
Bicycle	318	2.24
Work mainly at or from home	197	1.39
Train, DART or LUAS	142	1.00
Other (incl. lorry)	32	0.23
Motorcycle or scooter	25	0.18
Total	**14197**	

4.3.5 Landscape and Visual

The site is zoned for residential use and is located to the northeast of Athlone Town. The Site is in close proximity to Athlone employment areas, with the Blyry Industrial Estate located to the east of the Site and several employment areas all within 2km. The site is highly accessible to future residents with a continuous footpath connecting the Site to the town centre and to nearby leisure and community facilities (via the N55). The site is low lying meaning views of the site are confined to the immediate locality.

4.3.6 Human Health

Health, as defined by the World Health Organization (WHO), is *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"*. The Healthy Ireland Framework 2013-2025 defines health as *'everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'*. This framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country affects the quality of everyone's lived experience.

Health is an essential resource for everyday life, a public good and an asset for health and human development. A healthy population is a major asset for society and improving the

health and wellbeing of the nation is a priority for Government. Healthy Ireland Framework 2013-2025 is a collective response to the challenges facing Ireland's future health and wellbeing.

Table 4-11 shows that 85.45% of people have self-identified themselves as having "very good" or "good" health.

Table 4-11: Health Status of study area, County Westmeath and the State

Health Status	No. of People in Moydrum and Athlone EDs	Percent of People	No. of People in Westmeath	Percent of People
General health - Very good	12882	55.76	51990	58.57
General health - Good	6860	29.69	25481	28.70
General health - Fair	1956	8.47	7303	8.23
General health - Bad	359	1.55	1200	1.35
General health - Very Bad	76	0.33	251	0.28
Not stated	969	4.19	2545	2.87
Total	**23102**		**88770**	

4.3.7 Social Health

According to the World Health Organisation, poor social and economic circumstances affect health throughout life. Good health involves reducing levels of educational failure, reducing insecurity and unemployment, and improving housing standards. Health is influenced, either positively or negatively, by a variety of factors. Some of these factors are genetic or biological and are relatively fixed. '*Social determinants of health*'arise from the social and economic conditions in which people live. They are not so fixed such as type of housing and environments, access to health or education services, incomes generated and the type of work people do, can all influence a person's health, and the lifestyle decisions people make.

A range of factors have been identified as social determinants of health. These can include the wider socio-economic context, inequality, poverty, social exclusion, socioeconomic position, income, public policies, health services, employment, education, housing, transport, the built environment, health behaviours or lifestyles, social and community support networks and stress.

People who are less well off or who belong to socially excluded groups tend to fare badly in relation to these social determinants. Being at work on the other hand provides not only an income, but also access to social networks, a sense of identity and opportunities for development or progression.

Figure 4-4 presents the social determinants of health adapted from Dalghren and Whitehead (1991) and Grant and Barton (2006) as presented in Healthy Ireland.

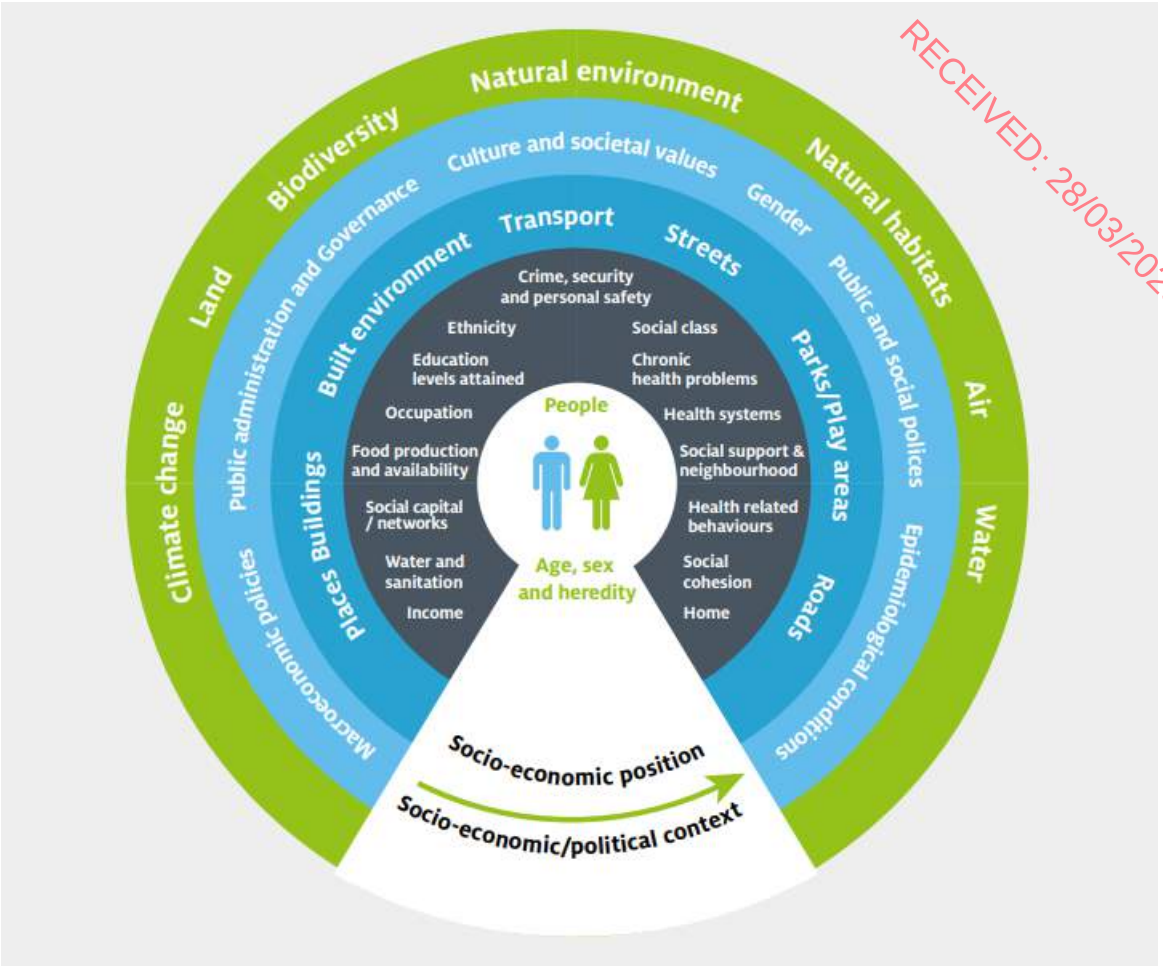

Figure 4-4: Social Determinants of Health (Healthy Ireland, DOH 2013)

Section 4.3.3 of this Chapter states that 60.1% of people in the study area are in the labour force. This reflects the high number of people of a working profile living within the area which is expected due to the percent of people of a working age living in the area as identified in Table 4-6.

The Proposed Development will allow for the creation of new employment. It is proposed an approximately 150 no. jobs will be created during the peak Construction Phase and an average of approximately 11 no. jobs (creche) will be created during the Operational Phase of this development (See Section 4.5.2.2).

As detailed in Table 4-11, the majority of people in the study area have self-identified themselves in the 2016 Census as having ‘very good health’ or ‘good health’. The high employment levels, coupled with the self-identification of health status indicate that positive social health conditions exist.

4.3.8 Community Amenities

A Schools, Childcare and Social Infrastructure Assessment (SCSIA) was prepared by Genesis Planning for the Proposed Development and is included as Appendix B in this EIAR. This report assessed the baseline educational and childcare infrastructure in the study area including Preschool / Creche, Primary School and Post Primary School (Figure 4-5). The report also provides an overview of Social Infrastructure in the area (Figure 4-6).

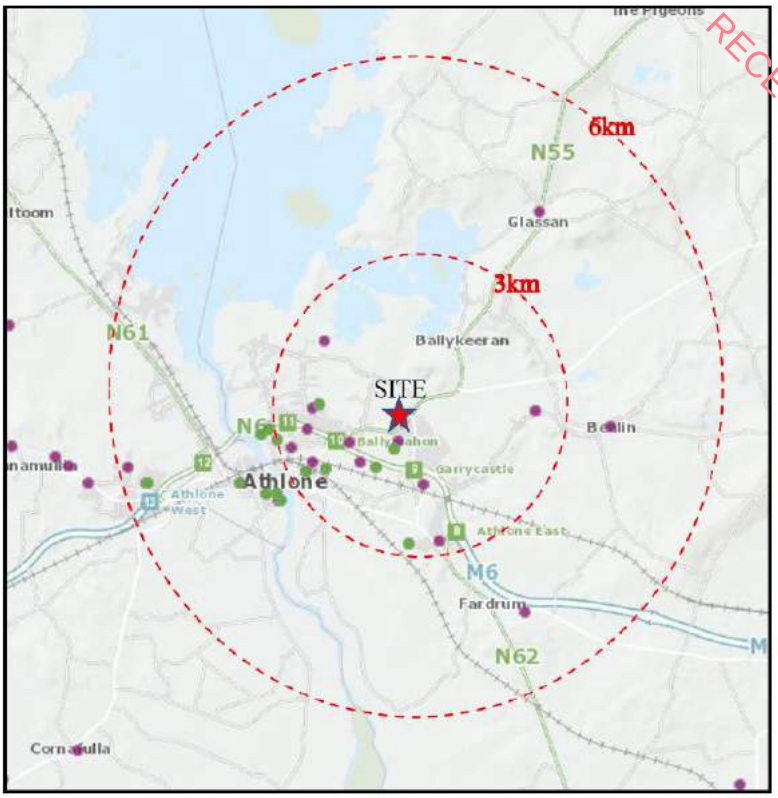

Figure 4-5 Existing childcare facilities in the Athlone area (SCSIA, Genesis Planning)

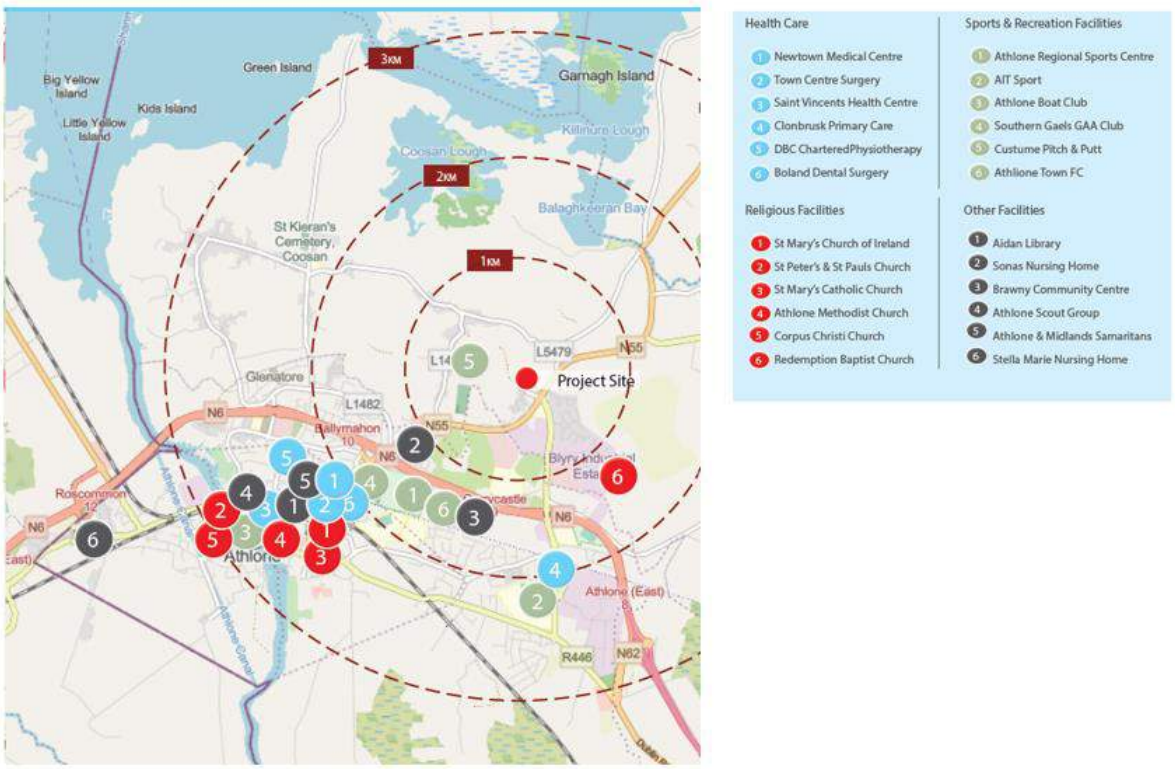

Figure 4-6 Social Infrastructure within a 3km radius of the site (Planning Report, Genesis Planning)

4.4 Characteristics of the Proposed Development

The Proposed Development will provide 332 residential units and a crèche facility. The schedule of accommodation includes a wide variety of dwellings including apartments/duplex units ranging from 1 to 4 bed units. A detailed description of the Proposed Development is presented in Chapter 2.

4.5 Potential Impact of the Proposed Development

4.5.1 Construction Phase

The Proposed Development has the potential to cause additional traffic, noise, dust, and visual impacts. Each of these impacts have been assessed in full in the respective Chapters of this EIAR and in the following subsections.

4.5.1.1 Human Health

The Proposed Development has the potential to provide health improvements due to the creation of additional employment. Employment and income are among the most significant determinants of long-term social health. This will be a positive impact due to the creation of direct and indirect employment during the construction phase. It is anticipated that up to approximately 150 no. construction staff will be employed either directly or indirectly during the peak of the Construction Phase.

4.5.1.2 Socio-economic

The Proposed Development will allow for the creation of direct employment. As stated above, there will be approximately an average of 150 staff directly employed during the Construction Phase of the project. The Proposed Development will also have indirect, positive socio-economic impacts with suppliers, drivers delivering supplies to and from the Site and construction workers utilising local shops and other businesses in the surrounding areas. Therefore, the Proposed Development will have a slight positive impact in terms of additional direct and indirect employment and on the local socio-economic environment and will be short-term in duration.

4.5.1.3 Hydrology – Water Quality

During the Construction Phase there is potential for demolition and excavation works to impact ground water and surface water quality. Pollution of water bodies and ground water can occur from accidental spills of fuel or chemicals used during construction. Mismanaged construction waste can also enter water bodies if not disposed of or stored correctly. Any water quality impacts can negatively impact the human health of residents of the Proposed Development and surrounding dwellings. Chapter 7 of this EIAR has concluded there will be no significant impact on the receiving groundwater and surface water environment. This will ensure there will not be a significant impact on population and human health as a result of the Construction Phase.

4.5.1.4 Air Quality and Climate

Nuisance dust emissions from construction activities, including traffic, are a common and well recognised problem which can negatively impact air quality. Fine particles from these sources

are recognised as a potential significant cause of pollution and can be damaging to the health of the surrounding population during the Construction Phase.

According to the Health Service Executive (HSE), the health effects associated with the main pollutants of concern are:

- Nitrogen Dioxide, Sulphur Dioxide, Ozone - Irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.
- Particles (PM10, PM2.5) - Can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.
- Carbon Monoxide - Prevents the uptake of oxygen by the blood and poses a greater risk to those suffering from heart disease.

Chapter 8 of this EIAR had identified residential dwellings as high-sensitivity receptors for significant dust soiling within 100m of the site. Within this distance 6 no. sensitive receptors have been identified, all of which are residential dwellings in the absence of mitigation, it is considered that there is potential for dust impacts to occur at these locations. It is expected that adequate mitigation measures, as outlined in Section 8.6.1 of this EIAR, will prevent nuisance dust from resulting in any adverse impacts. Chapter 8 of this EIAR has concluded that there will be no significant impacts on air quality as a result of the Proposed Development and as such there will be no significant impact on human health.

4.5.1.5 Noise and Vibrations

Noise generating activities associated with the Construction Phase have been identified in Chapter 9 Noise and Vibrations of this EIAR and include vehicular traffic as well as noise from the operation of fixed or mobile machinery onsite. During the Construction Phase all operations will comply with the BS5228:2009 “Noise and Vibration Control on Construction and Open Sites. The noise-generating activities associated with the Site are as follows:

- Site clearance works;
- Building construction works;
- Trucks entering and existing the site;
- Traffic along local road network.

Noise exposure can cause a variety of human health effects including annoyance, sleep disturbance, raised stress levels, work impacts for commercial receptors or individuals who work from home. Chapter 9 of this EIAR has identified 6 no. Noise Sensitive Locations which are located approximately 20m - 60m from the Proposed Development Site Boundary, all of which are residential properties. There is the potential for the adopted criteria to be exceeded by both the loading shovel and the dozer during the construction works at the nearest sensitive receptors. However, there are hedgerows on the intervening lands between the Site Boundary and the residential dwellings. Therefore, when taking account of local terrain, predicted noise levels at the closest residential noise sensitive locations are expected to be lower than the adopted criteria as outlined in Chapter 9. Nevertheless, mitigation measures, as outlined in Chapter 9, will be implemented to reduce any potential impacts.

Therefore, the impact of noise and vibration on human health during the construction phase will be negative, short term and not significant.

4.5.1.6 Traffic and Transport

There is potential for construction traffic to impact the surrounding population and human health by causing congestion on the local road network. The number of construction related vehicle movements have been detailed in the Construction Environmental Management plan (CEMP) which details that:

> *"5 no. HGV movements per hour are anticipated and workers vehicles attending the site will be arriving outside of any peak traffic periods. Overall, construction traffic will be less than traffic volumes generated during the operational phase of the development."*

The CEMP has also detailed mitigation measures to ensure there are no significant impacts as a result of construction vehicles.

4.5.2 Operational Phase

The Proposed Development is likely to give rise to a direct impact on the surrounding environment during the Operational Phase. The Operational Phase of the Proposed Development will potentially result in the mobility of heavy vehicles,

4.5.2.1 Human Health

All workers employed during the operational phase of the Proposed Development will comply with the relevant HSE guidelines and any Government protocols that will be in place at that point in time in relation to Covid-19.

Radon is a radioactive gas which causes about 350 cases of lung cancer in Ireland each year. It is formed in the ground by the radioactive decay of uranium which is present in all rocks and soils. According to the Environmental Protection Agency's (EPA) Radon Risk Map the site of the Proposed Development is situated in an area where "*About 1 in 10 homes in this area are likely to have high radon levels*" which we note is not classed as a high radon area. (Note: The EPA cite the reference level for radon as 200 Bq/m^3 and a High Radon Area where more than 10% of homes may have more than the reference level of radioactivity). As up to 10% of the houses in the area are mapped by the EPA as being over this reference level it indicates that the Site is not considered a High Radon Area however, it is noted that a high radon level can be found in any home, in any part of the country.

In this context and to minimise Radon risk, the design and specification of the Proposed Development will be in accordance with current Building Regulations and therefore any potential issues associated with radon will be addressed and avoided. Furthermore, we also highlight for buildings built since 1st July 1998 in High Radon Areas the installation of a radon membrane is required and all buildings will be fitted with a standby radon sump (Environmental Protection Agency, EPA). As such no further assessment of Radon is required in relation to human health and the impact will be neutral, not significant and long term.

4.5.2.2 Socio-Economic

The Proposed Development will allow for the creation of new employment. It is proposed that a small number of jobs will be created as a result of this development during the operational phase.

The regulation of pre-school childcare services is set out in the Child Care Act 1991 (Early Years Services) Regulations 2016. This act describes the standards of health, safety and welfare that must be in place before such services can be provided including the required staffing levels. Point 11 "*Staffing levels*" of Part III "*Management and Staff*" of the act states:

> *"…a registered provider shall ensure that there is at all times an adequate number of adults working directly with the children attending the pre-school service"*

Table 4-12 is adapted from the Citizens Information website and provides information on the required ratios of staff to children. For the purpose of estimating the number of staff that will be employed in the proposed creche it has been assumed that the pre-school service being provided is full/part-time day care. According to the Schools, Childcare and Social Infrastructure Assessment prepared for the Proposed Development by Genesis Planning Consultants (Appendix B) "*the proposed creche can readily accommodate 48 no. childcare spaces*". Although it can be assumed that the proposed creche will accommodate a range of different age groups from 0-6 years old, at this time the precise breakdown is unknown. For this reason, a minimum and maximum number of employees has been estimated and an average calculated. It is estimated that during the operational phase a minimum of approximately 6 staff and a maximum of approximately 16 staff will be employed giving an average of approximately 11 staff. This will have a slight positive and short to long term socio-economic impact depending on the operational duration of the creche.

Table 4-12 Ratio of staff to children (Citizens Information)

Pre-school service	Age of children	No. of adults	No. of children	Floor area per child
Full/part-time day care	0-1 year	1	3	3.5 sq metres
	1-2 years	1	5	2.8 sq. metres
	2-3 years	1	6	2.35 sq. metres
	3-6 years	1	8	2.3 sq. metres

The Proposed Development has the potential to increase the level of direct and indirect employment associated with the operational phase. The Proposed Development will have economic benefits such as positive effect in terms generating economic activity with spin-off economic activity created for local retail and service providers.

The Proposed Development will have both a direct and indirect positive impact on the socio-economic health of the surrounding area through the creation of employment. The Proposed Development will have a slight positive and medium-term socio-economic effect.

4.5.2.3 Hydrology

Drinking water for residents and the creche will be supplied by mains water supply. There will be no direct discharges to groundwater or surface water from the Proposed Development Site. As per Chapter 7 of this EIAR there will be no significant sources of contamination at the Site during the Operational Phase and as such there will be no significant, adverse impact on human health.

4.5.2.4 Air Quality and Climate

The greatest potential effect on air quality during the Operational Phase of the Proposed Development is from traffic-related air emissions.

According to the Health Service Executive (HSE), the health effects associated with the main pollutants of concern are:

- Nitrogen Dioxide, Sulphur Dioxide, Ozone - Irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.
- Particles (PM10, PM2.5) - Can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.
- Carbon Monoxide - Prevents the uptake of oxygen by the blood and poses a greater risk to those suffering from heart disease.

An air quality assessment has been carried out as part of Chapter 8 of this EIAR which includes nine (9 No.) receptors within 200m of the of the site. Eight (8 no.) of these are residential dwellings and one (1 no.) is a school. Chapter 8 has concluded that the impact of the Proposed Development on NO_2 concentrations in the locality is likely to be long-term, negative and imperceptible.

As such the impact of air quality and climate on human health will be neutral, long term and not significant.

4.5.2.5 Landscape and Visual

The Proposed Development will involve a change in the nature of the site as a greenfield site is altered to a large-scale residential development. The surrounding landscape and visual appearance can have an impact on the amenity of the area which in turn can affect the human health of those living and working the area surrounding the Proposed Development. Chapter 10 of this EIAR has concluded that the potential landscape impacts will be neutral and long-term as a result of the Proposed Development. In terms of visual impact, 9 no. viewpoints were selected and a visual impact assessment was carried out. No viewpoints are considered as having a significant, negative and long-term impact. It's concluded that the proposed green structure will mitigate, in the medium-term, the identified moderate visual impacts.

As such the impact of landscape and visual will have a non-significant, neutral-negative, medium-term impact on human health.

4.5.2.6 Traffic and Transport

A full assessment of traffic and transport effects are presented in Volume 3 Traffic Impact Assessment of this EIAR. The Proposed Development will result in an increase in the population of the area and thus an increase in the number of people utilising the local road network. This has the potential to cause congestion thus impacting the human health of road users.

Capacity assessments have been carried out for AM and PM peak hours for the N55 / R916 / L8048 Roundabout which currently operates within capacity. The Traffic Impact Assessment states:

> *"The existing N55 / R916 / L8048 roundabout will continue to operate within capacity with small queues and delays when the proposed residential development and the*

future residential developments adjacent to the development are complete in 2042, fifteen years after opening".

As such there will be no significant adverse impact on population and human health as a result of traffic and transport associated with the proposed Development.

4.5.2.7 Noise and Vibrations

The primary source of outward noise during the operational phase relates to any changes in traffic flows along the local road network and any operational plant noise used to serve the ancillary elements within the residential units and the crèche.

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 are expected from this area of the development site.

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the Operational Phase and as such Chapter 9 of this EIAR has concluded the impact of noise from operational traffic will be unnoticeable and will not have a negative impact. As such there will be no negative significant impact on population and human health as a result of operational traffic in terms of noise.

An Inward Noise Impact Assessment was prepared which included a baseline noise survey to determine the existing noise environment at the site (Appendix H). The development site may be categorised as *Low to Medium Risk.* The report concluded that;

"Based on the implementation of the measures outlined in the Inward Noise Impact Assessment, the predicted noise levels conform to the criteria taken from BS8233:2014 for acceptable internal noise levels."

As such the impact on human health as a result of noise and vibration during the operational phase will be neutral, long term and not significant.

4.5.2.8 Daylight and Sunlight Assessment

A Daylight and Sunlight Assessment was carried out by Digital Dimensions for the Proposed Development (2023) (Appendix C). None of the adjacent properties have the potential to experience a reduction in sunlight or daylight due to the Proposed Development and the impact on adjacent properties as result of the Proposed Development will be "*minimal and imperceivable*". 100% of the Living, Dining, Kitchen and Bedroom spaces to the apartments and duplexes achieve the target values set out in BS EN 17037:2018+A1:2021 and the rooms will achieve high levels of daylight and they will be bright and pleasant apartments and duplexes. The living spaces of 132 units (82.5%) achieve the minimum recommended 1.5 direct sunlight hours.

The majority of the apartment units achieve the recommendations outlined under the BRE guidelines however where all of the requirements of the daylight provisions have not been met, compensatory measures have been incorporated into the design.

4.5.2.9 Community Amenities

A Schools, Childcare and Social Infrastructure Assessment (SCSIA) was prepared by Genesis Planning for the Proposed Development and is included as Appendix B in this EIAR.

The school demand generated by the Proposed Development was estimated based on the units which can accommodate families / units that include for children. When taking account of the average number of children per family the Proposed Development is estimated to generate 295 no. school age children when the Proposed Development is fully occupied, resulting in an average of 59 total primary and post primary school place requirement per annum.

In summary, as per the SCSIA, the demand for primary and post primary school places generated by the Proposed Development will likely be absorbed by the surrounding schools in the Athlone region and should not cause additional demand that cannot be catered for. In relation to childcare, there is sufficient capacity in the area for existing childcare demand. The childcare facility as part of the Proposed Development does not need to cater for any existing surplus demand outside of the site area itself at Cornamaddy.

The proposed creche can readily accommodate 48 no. childcare spaces, which is considered adequate to meet the requirement generated by the Proposed Development, along with additional headroom of 20% if required to serve the wider area. The provision of surplus childcare facilities will have a slight, positive, medium-term impact on the Community Amenities in the area.

The Proposed Development will be located in a well-provided for neighbourhood and within a short distance of a wide range of services for future residents. As detailed in Section 4.3.9 of this Chapter, there is a good mix of social infrastructure facilities in the immediate area. Health care, Sports and Recreation, Community, education, and other facilities are all well-represented within the wider area and cater for the existing and proposed new residential community (SCSIA, Genesis Planning 2023).

4.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

All planning applications which have been granted permission and are already developed have been incorporated into the baseline assessment of this application. A planning search has revealed that there have been a number of planning applications in the vicinity of the Proposed Development site which have been granted permission, that could potentially cause cumulative impacts with the Proposed Development.

Table 4-13: Recent applications in the vicinity of the Proposed Development

Planning Ref No.	Applicant Name	Summary of Development
22253 06/12/2022	Marina Quarter Ltd	The development will consist of the following: • Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces; • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the south east of the site. • All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. esb substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; • This development will form part of a larger/future phase of the development; • No changes to the existing pumping station located outside the northern site boundary; A Natura Impact Statement has been prepared in respect of this application.
22340 Decision Due Date: 04/02/2023	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area (c. 595 sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Refs

Planning Ref No.	Applicant Name	Summary of Development
		14/7103 ABP Ref. PL25.244826 and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated esb substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

Cumulative impacts relating to population and human health include air quality, noise and vibration and traffic impacts which have been assessed in their respective Chapters of this EIAR. The Schools, Childcare and Social Infrastructure Assessment has concluded that there is sufficient infrastructure in the study area to facilitate the Proposed Development. Due to the full implementation of management controls to avoid adverse impacts from the Proposed Development and the proposed off-site projects, as listed in Table 4-13, it is not expected that cumulative impacts from these developments are likely to result in significant adverse effects on population and human health.

4.5.4 'Do Nothing" Impact

The Do-Nothing impact has been considered in terms of population and human health in this Chapter. If the Proposed Development did not proceed, the Proposed Development site would remain as a greenfield site and there would be no immediate impact on the existing population or economic activity for residents living in the area. This would be an under-utilisation of zoned and serviceable urban lands from a sustainable planning and development perspective.

4.6 Avoidance, Remedial and Mitigation Measures

4.6.1 Construction Phase

No specific mitigation measures are required during the Construction Phase of the Proposed Development in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, mitigation measures in relation to air quality, noise, traffic, waste etc. are identified in their respective Chapters in this EIA Report.

4.6.2 Operational Phase

No specific mitigation measures are required during the Operational Phase of the Proposed Development in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, mitigation measures in relation to air emissions, noise, traffic, waste etc. are identified in their respective Chapters in this EIA Report.

4.6.3 "Worst Case" Scenario

In the event that all mitigation measures fail to hinder potential negative impacts, the following possibilities may occur:

- An increase of traffic within the surrounding roads and junctions of the Site

- An increase in noise caused during the construction phase can cause a disturbance any residential dwellings in close proximity to the Site.
- An increase in the production of dust that can be carried throughout the Site and create adverse effects on the neighbouring environment, including the residential dwellings and school located within 200m of the site.

However, it is imperative that such mitigation measures are implemented to ensure that the worst-case scenario does not occur. When considering the mitigation measures that will be in place, the event of a worst-case scenario is deemed to be unlikely.

4.7 Residual Impacts

Residual Impacts are defined *as 'effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

It is considered that there will be a slight positive impact on the population and human health a result of additional employment. No specific mitigation measures have been proposed for population and human health so residual impacts will be slight positive.

4.8 Monitoring

No specific monitoring is proposed in relation to population and human health during the Construction or Operational Phase.

4.9 Interactions

4.9.1 Hydrology

Pollution events can impact the water quality and thus impact the human health of the surrounding population. Appropriate surface water control measures will be implemented as part of the Proposed Development. No public health issues associated with the water conditions at the Site have been identified for the Construction Phase or Operational Phase of the Proposed Development. There are no likely significant adverse impacts as a result of Hydrology and as such there will be no significant impacts on population and human health. Hydrology has been fully assessed in Chapter 7 of this EIAR.

4.9.2 Air Quality and Climate

Interactions with air quality during the construction and operational phase has the potential to cause issues relating to dust and traffic emissions impacting human health. However, Chapter 8 has concluded that there will be no significant air quality impacts. All ambient air quality legislative limits will be complied with and therefore the predicted impact is not significant with a neutral effect on human health. Air quality is discussed further in Chapter 8 of this EIAR.

4.9.3 Noise and Vibration

Construction activities such as site clearance, building construction works and trucks and vehicles entering and exiting the Site have the potential to interact with the surrounding population and human health and cause noise disturbance. The impact assessment of noise and vibration has concluded that additional noise associated with the construction and operational phase will not cause a significant negative impact.

Operational Phase noise impacts have also been assessed in relation to traffic and plant equipment and no significant negative impacts will be experienced. As such, there will be no significant impact on population and human health. Noise is fully assessed in further detail in Chapter 9 of this EIAR.

4.9.4 Landscape and Visual

The Proposed Development will alter the visual appearance of the site which is predominantly a greenfield site. It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the zoning of the Site of the Proposed Development and the residential nature of the surrounding landscape, will cause any significant impacts and as such there will be no significant impact on population and human health.

4.9.5 Material Assets – Traffic and Transport

Construction activities will result in an increased number of HGV movements. During the operational phase there will be an increase in the population of the area and thus an increase in the number of road users. There is a potential impact on population and human health in relation to the capacity and operation of the surrounding road network. The existing N55 / R916 / L8048 roundabout will continue to operate within capacity with small queues and delays when the proposed residential development and the future residential developments adjacent to the development are complete in 2042, fifteen years after opening and subsequently there will be no significant impact on population and human health.

4.10 Difficulties Encountered When Compiling

Overall, there were no difficulties encountered when compiling this Chapter of the EAR. All research was conducted through a desk top study.

4.11 References

The Central Statistics Office (CSO)

Child Care Act 1991 (Early Years Services) Regulations 2016

Citizens Information, 2022. Regulation of school age childcare services. Accessed 07/03/2023 https://www.citizensinformation.ie/en/education/pre_school_education_and_childcare/health_safety_and_welfare_of_school_age_childcare_services.html#:~:text=Childcare%20services%20must%20ensure%20that%20children%20are%20appropriately%20supervised%20at%20all%20times.&text=All%20registered%20childcare%20services%20must,assist%20in%20case%20of%20emergency.&text=Centre%2Dbased%20services%20must%20ensure,age%20children%20at%20all%20times.

Westmeath County Development Plan 2021-2027

Ordinance Survey Ireland (OSI)

WHO. Ottawa Charter for Health Promotion First International Conference on Health

Promotion Ottawa, 21 November 1986 - WHO/HPR/HEP/95.1. 1986.

WHO. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. 1946.

Healthy Ireland Framework 2013-2025

Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999)

Assessment of Health Impacts within National Environmental Regulation Process. Report commissioned by Environmental Protection Agency. Golder Associates. April 2015.

5 BIODIVERSITY

5.1 Introduction

This Chapter describes the Biodiversity for the Proposed Development on the Site, and surrounding environs, with emphasis on habitats, flora and fauna, and details the methodology of assessment used in each case. It provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation, or considered to be of conservation importance; and proposes measures for the mitigation of these impacts, where appropriate. A description of residual effects that will remain following the implementation of mitigation is also outlined in this Chapter.

The Chapter has been completed having regard to the *Guidelines for Ecological Impact Assessment in the UK and Ireland*, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018), together with the guidance outlined in the Environmental Protection Agency (EPA) documents *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (May 2022) and *Advice Notes for Preparing Environmental Impact Statements* (Draft, September 2015). The value of the ecological resources, the habitats, and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's (NRA, now Transport Infrastructure Ireland) *Ecological Assessment Guidelines* (NRA, 2009).

5.1.1 Quality Assurance and Competence

All surveying and reporting has been carried out by qualified and experienced ecologists and environmental consultants. Rozalyn O'Hora, Ecologist with Enviroguide Consulting, prepared this Chapter and undertook the desktop research, habitat surveys, invasive species surveys, mammal surveys and bat surveys at the Site. Brian McCloskey, Ecologist and Ornithologist with Enviroguide Consulting undertook the breeding bird surveys, winter bird surveys and bat surveys at the Site.

Rozalyn O'Hora has a M.Sc. (Hons.) in Ecological Assessment from University College Cork, and a BSc (Hons.) in Environmental Science from the University of Galway. She has a wealth of experience in desktop research, literature scoping-review, and report writing, as well as practical field experience (Habitat surveys, invasive species surveys and bird surveys). Rozalyn has extensive experience in compiling Ecological Impact Assessments (EcIA), Stage I and Stage II Appropriate Assessment (AA) reports and in the overall assessment of potential impacts to ecological receptors from a range of developments.

Brian McCloskey has over 11 years of birding experience. Brian holds a degree in Planning and Environmental management from Technological University Dublin. Brian is a longstanding and active member of Bird Watch Ireland and has provided 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.

5.1.2 Relevant Legislation

5.1.2.1 Wildlife Act 1976 (as amended)

The Wildlife Act 1976 (as amended) 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 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.

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 Special Areas of Conservation (SAC) and/or Special Protection Area (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 from the date they are formerly proposed for designation, under the Wildlife Amendment Act (2000).

5.1.2.2 EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of SACs and the Birds Directive 79/409/EEC) seeks to protect birds of special importance by the designation 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 (QIs) of the sites; from these the conservation objectives of the site are derived.

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 regard 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*."

In view of their sensitive status across Europe, all species of bat have been listed on Annex IV of the EC 'Habitats Directive and some, such as the lesser horseshoe bat, are given further protection and listed on Annex II of this Directive. The obligations of the Habitats Directive have been transposed into Irish law and. combined with the Wildlife Acts 1976 to 2018, ensure that individual bats and their breeding sites and resting places are fully protected. This has important implications for those who own or manage sites where bats occur.

5.1.2.3 Flora (Protection) Order, 2022

The Flora (Protection) Order affords protection to several species of plant in Ireland, including 89 vascular plants, 40 mosses, 25 liverworts, 2 stoneworts 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.

5.1.2.4 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 SAC 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.

5.1.2.5 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' ecological status, through River Basin Management Plans (RBMP), by 2027.

5.1.2.6 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.

5.1.2.7 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.

5.1.3 Westmeath County Development Plan

Objectives of the Westmeath County Development Plan 2021 – 2027 that are of relevance to this chapter are outlined below:

5.1.3.1 CPO 12.24 states:

It is a policy objective of Westmeath County Council to:

Protect and where possible enhance biodiversity and ecological connectivity, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, geological and geo-morphological systems, other landscape features, natural lighting conditions, and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones in the context of Article 10 of the Habitats Directive. Appropriate mitigation and/or compensation to conserve biodiversity, landscape character and green infrastructure networks will be required where habitats are at risk or lost as part of a development.

5.1.3.2 CPO 12.39 states:

It is a policy of Westmeath County Council to:

Discourage the felling of mature trees and hedgerows, particularly species rich roadside and townland boundary hedgerows to facilitate development and seek Tree Management Plans to ensure that trees are adequately protected during development and incorporated into the design of new developments.

5.1.3.3 CPO 12.40 states:

It is a policy objective of Westmeath County Council to:

Protect and preserve existing hedgerows in new developments, particularly species rich roadside and townland boundary hedgerows, and where their removal is necessary during the course of road works or other works seek their replacement with new hedgerows of native species indigenous to the area.

5.1.3.4 CPO 12.58 states:

It is a policy objective of Westmeath County Council to:

Ensure that the County's watercourses are retained for their biodiversity and flood protection values and to conserve and enhance where possible, the wildlife habitats of the County's rivers and riparian zones, lakes, canals and streams which occur outside of designated areas to provide a network of habitats and biodiversity corridors throughout the county.

5.1.3.5 CPO 12.60 states:

It is a policy objective of Westmeath County Council to:

Ensure that run off from a proposed development does not result in a deterioration of downstream watercourses or habitats.

5.1.4 Description of the Proposed Development

The Proposed Development (as detailed in Chapter 2) comprises of the provision of a total of 332 no. residential units along with provision of a creche. The Proposed Development will comprise the following:

o) Site excavation works to facilitate the Proposed Development to include excavation and general Site preparation works.
p) The provision of a total of 172 no. 2 storey residential dwellings which will consist of 152 no. 3bed units and 20 no. 4 bed units.

q) The provision of a total of 160 no. apartments/duplex units consisting of 36 no. 1 bed units, 99 no. 2 bed units and 25 no. 3 bed units. The apartment blocks range in height from 2 storey to 4 storey and the duplex blocks will range from 2 storey to 3 storey in height.
r) Provision of a 2 storey creche.
s) Provision of associated car parking at surface level via a combination of in-curtilage parking for dwellings and via on-street parking for the creche, duplexes and apartment units.
t) Provision of electric vehicular charge points with associated Site infrastructure ducting to provide charge points for residents throughout the Site.
u) Provision of associated bicycle storage facilities at surface level throughout the Site and bin storage facilities.
v) Provision of a new link road via adjacent lands to the west to provide for vehicular, pedestrian and cyclist access.
w) The provision of internal culverts and associated bridges along with a realignment of a section of an existing drainage channel within the Site to facilitate internal access roads along with associated crossing points across the drainage channel (to facilitate pedestrian and vehicular crossing points).
x) The creation of a pedestrian footpath alongside the local road which will connect to the existing footpath aligning the N55 National Road.
y) Provision of associated open space areas, residential communal open space areas to include a formal play area along with all hard and soft landscaping works for private gardens and amenity spaces along with public lighting, planting and boundary treatments to include boundary walls, railings and fencing.
z) Provision of 2 no. ESB substations.
aa) Internal Site works and attenuation systems.
bb) All ancillary Site development/construction works to facilitate foul, water and service networks for connections to the existing foul, water and ESB networks.

5.2 Study Methodology

This section details the steps and methodology employed to undertake the EcIA of the Site of the Proposed Development.

5.2.1 Scope of assessment

The specific objectives of the study were to:

- Undertake a baseline ecological survey of the Site and evaluate the nature conservation importance of the Site;
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the project during its lifetime;
- Where possible, proposed mitigation measures to remove or reduce those impacts at the Design, Construction and Operational Phases; and
- Achieve the best possible biodiversity outcome for the future of the Site.

5.2.2 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 a proposed development and associated activities. This is

likely to extend beyond the Site, for example where there are ecological or hydrological links beyond the Site's boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change. The ZOI of the Proposed Development is considered to be the lands within the Proposed Development Site for most ecological receptors. The exception being otter dens which require a 150m protection zone, active badger setts which require a 30m protection zone (a 50m protection zone is required during the badger breeding season and a 150m protection zone is required if works include pile driving or blasting) and designated sites, e.g., European sites, Ramsar sites, NHAs and pNHAs – see below.

To determine the ZOI of the Proposed Development for designated sites, reference was made to the OPR Practice Note PN01 – 'Appropriate Assessment for Development Management' (OPR, 2021), a practice note produces by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for 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 of EIAR such as this; with regards identification of 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 of the following:

- Use of current 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 Proposed Development and any designated sites;
- All designated sites within the ZOI (within 15km of the Proposed Development) were identified and are shown in
- Figure 5-1 and Figure 5-2;
- 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 (S-P-R) model;
- Table 5-6 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 S-P-R model as per the OPR Practice Note PN01 (March 2021). Pathways considered include:

- Direct pathways e.g., proximity (i.e., location within the designated sites), 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.

5.2.3 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 desk study, completed in January 2023, relied on the following sources:

- Information on species records [1] and distributions, obtained from the National Biodiversity Data Centre (NBDC) at https://maps.biodiversityireland.ie/;
- Information on waterbodies, catchment areas and hydrological connections obtained from the 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 designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the 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 development, or developments awaiting decision, in the vicinity of the Proposed Development from Westmeath County Council and An Bord Pleanála;
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 5.11.

5.2.4 National Biodiversity Data Centre (NBDC) records

The Site is located within the Ordinance Survey Ireland National 2km grid square N04R. Species records dated within the the last 20 years were studied for the presence of invasive, rare or protected flora and fauna. 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. These records are presented in section 0.

5.2.5 Field Surveys

A range of field surveys have been carried out at the Site to inform this Biodiversity Chapter. The following sections provide details of the field surveys carried out.

5.2.5.1 Habitat Surveying, Mapping and Evaluation

A habitat survey of the Site was carried out by Enviroguide Ecologists on the 30th of August 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*

[1] The Proposed Development Site lies within the 2km grid square N04R. Records from the last 20 years from available datasets are given in the relevant sections of this Chapter.

Practice Guidance for Habitat Survey and Mapping' (Smith *et al*., 2011) published by the Heritage Council. Habitat categories, characteristic plant species and other ecological features and resources were recorded on field sheets. Habitats within the surrounding area of the Site were classified based on views from the Site and satellite imagery where necessary (Google Earth, Digital Globe and OSI).

The habitat and flora surveys were conducted during the appropriate survey period as recommended in both Smith et al. (2011) and NRA (2009).

5.2.5.2 Invasive Species Survey

The Site was assessed for the presence of invasive plant species during the habitat surveys undertaken on the 30th of August 2022. The location of invasive species was documented on the field map or through the use of GPS in the field. 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, 2022).

The invasive species surveys were primarily focused on plant species that are listed on Schedule III of the European Communities (Birds and Habitats) Regulations and considered to be 'High impact' invasive species e.g., Japanese knotweed (*Reynoutria japonica*). Incidental observations of other terrestrial plant species known to be potentially invasive, such as butterfly bush (*Buddleja davidii*), were also recorded.

It is an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow any invasive species scheduled on the European Communities (Birds and Habitats) Regulations and species listed as 'high' impact under the National Biodiversity Data Centre's (NBDC) 'Invasive Species in Ireland Prioritisation Risk Assessment'.

5.2.5.3 Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with other field surveys. The mammal surveys conducted as part of this assessment had regard to the survey guidelines contained in *Guidelines for the Assessment of Ecological Impacts of National Road schemes* (NRA, 2009). The Site was searched for signs of mammals such as burrows, setts, droppings, foraging signs and tracks as per Bang and Dahlstrom (2001). The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

5.2.5.4 Bat Surveys

5.2.5.4.1 Habitat Evaluation

The survey area was assessed during daytime walkover surveys on the 30th of August and 26th of September 2022 in relation to potential bat foraging habitat and potential bat commuting routes. The bat survey data results are presented in Appendix D. Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs. The Bat Conservation Trust (BCT, 2016) guidelines were followed for the assessment rating and classified using Table 4.1 of the same which is recreated in Table 5-1 of this report.

Table 5-1: Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of roost features within the landscape, to be applied using professional judgement (BCT, 2016).

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible roosting features on Site and therefore unlikely to be used by roosting bats.	Negligible habitat features on Site and therefore unlikely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[2] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be suitable for maternity or hibernation[3]). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only limited roosting potential[4].	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers or foraging bats such as a long tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[5] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub of linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[2] and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourses and grazed parkland. Site is close to and connected to known roosts.

[2] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

[3] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

[4] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015)

5.2.5.4.2 Bat Activity Surveys

Bat activity surveys were carried out at the Site on the 30th of August 2022 (sunset on the night was 20:26, temperature on the night ranged from 13-15ºC for the duration of the survey with a gentle breeze) and the 26th of September 2022 (sunset on the night was 19:21, temperature on the night ranged from 10-11.5ºC in calm cloudy conditions). The post-sunset (dusk) activity surveys commenced approximately 15 minutes before sunset and lasted until approximately 2 hours after sunset. Both survey dates were undertaken at the appropriate time of year (April – October), in optimal weather conditions (i.e., calm, dry and warm) as per Bat Conservation Trust guidelines (Collins, 2016).

The equipment used included an 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). A Seek Thermal Reveal Pro High-Resolution Thermal Imaging Camera was also used along with a RIDGID 36848 Micro CA-150 Hand-held Borescope for inspection of any crevices on trees.

A predetermined transect of the Site was walked, allowing the Site's field boundaries and areas of vegetation to be surveyed for bat usage. Where activity was noted, the surveyors remained in place for several minutes to ensure a representation of the activity was recorded.

The data collected was analysed and species assigned to each record with reference to species identification guides such as Russ (2012).

5.2.5.4.3 Potential Bat Roost Assessment

Trees that may provide a roosting space for bats were classified using the Bat Tree Habitat Key (BTHK, 2018) and the classification system adapted from Collins (2016). The Potential Roost Features (PRFs) listed in BTHK (2018) were used to determine the PRF value of the trees on Site. A Phase 1 inspection was undertaken to make a list of the trees within the Proposed Development Site that may be suitable as roosting sites for bats. Inspections were undertaken visually with the aid of a strong torch beam (AP Pros-Series 220 Lumens High Performance Spotlight) and Celestron12x56 Prism Binoculars during the daytime searching for PRFs, if visible. To aid this Phase 1 inspection, tree reports, where available, were consulted to supplement the data collected. A RIDGID 36848 Micro CA-150 Hand-Held Borescope was used for inspection of any accessible crevices on trees (3m from the ground).

During the survey, the features listed below on the affected trees were sought as they may provide suitable roost sites for bats:

- Natural holes (e.g., knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
- Man-made holes (e.g., cavities that have developed from flush cuts or cavities created by branches tearing out from the parent stems).
- Cracks/spits in stems or branches.
- Partially detached, loose or bark plates.
- Cankers (caused by localised bark death) in which cavities have developed.
- Other hollows or cavities, including butt rots.
- Compression stems or branches with suitable roosting space between.

- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
- Bat or bird boxes.
- Other suitable places of rest of shelter.

Trees within the Site, if identified as Potential Bat Roosts, were categorised as offering high, medium or low roosting potential (Table 5-1) and inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also can indicate that bat usage of a crevice, for example, has occurred in the past.

5.2.5.5 Bird Surveys

A number of bird surveys were undertaken at the Site with a focus on the Birds of Conservation Concern in Ireland (Gilbert at al., 2021) and the waterbird species associated with the SPAs within the ZOI.

5.2.5.5.1 Breeding Bird Surveys

Breeding bird surveys of the Site were undertaken by Enviroguide Ecologist/Ornithologist Brian McCloskey on the 11th and 19th of July 2022. The survey methodology was adapted from the British Trust for Ornithology's (BTO) Common Bird Census (CBS) technique (2nd edn) (Bibby et al., 2000). Several transects were walked and all bird species identified were recorded on field sheets including where possible their locations, behaviour and numbers. A final zig-zag walk through the Site was carried out at the end of each survey to ensure no additional species were missed.

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. Bird identifications were confirmed where necessary using '*The Complete Guide to Ireland's Birds*' by Dempsey E. & O 'Cleary (2002).

5.2.5.5.2 Winter Waterbird Surveys

A set of targeted winter bird surveys were carried out at the Site over the course of the 2022/2023 winter by Enviroguide Ornithologist Brian McCloskey. The objective of these surveys was to provide a robust evidence-based assessment of whether the Site of the Proposed Development is, or has the potential to be, in its current state, utilised as *ex-situ* feeding/roosting grounds by species of waterbirds listed as Special Conservation Interests (SCI) species or associated with the nearby SPAs.

The survey methodology was adapted the non-breeding bird survey guidelines published by the Bird Survey & Assessment Steering Group (2022) 'Bird Survey Guidelines for assessing ecological impacts'. Each survey consists of a combination of walked transects of the Site (being walked at a slow, ambling pace, stopping to scan priority habitat/features where appropriate) and vantage point observation from fixed points, as required. The flight-line survey component consists of vantage point observation by a surveyor using binoculars and identification guides where necessary to identify all target species in flight over the Site. Prior to the commencement of the survey, the Site was walked and checked for any obvious

evidence of SCI species usage e.g., Light-bellied Brent Goose (*Branta bernicla hrota*) droppings.

All surveys were undertaken using:

- Swarovski 8x42 binoculars (or equivalent).
- Swarovski 20x Telescope (or equivalent).
- Agreed survey methodology.
- Field notebook.

During the 2022/23 survey season, a total of five survey days were carried out at the Site; covering October, November and December 2022 and January and March 2023. These surveys provide a summary of the usage of the Site by SCI species during the winter. A total of 24 hours of surveys were carried out at the Site. The winter waterbird surveys were conducted at the appropriate time of year between October and March. The winter bird survey data is presented in Appendix E.

5.2.5.6 Other Fauna

During the ecological surveys at the Site of the Proposed Development, cognisance was taken of other species of fauna that might use the Site. These are included in the Chapter where applicable.

5.2.6 Baseline Assessment

The value of the ecological resources i.e., the habitats and species present or potentially present, was determined using the ecological evaluation guidance provided in the NRA's Ecological Assessment Guidelines (NRA, 2009) (presented in Table 5-2). 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. The NRA (2009) defines Key Ecological Receptors (KERs) as those ecological features which are evaluated as Locally Important (higher value) or higher, that are likely to be impacted significantly by the Proposed Development. Internationally important receptors would include SAC or SPA while those of national importance would include NHAs and pNHAs.

This evaluation scheme has been adapted here to assess the value of habitats and fauna within the Site. The value of habitats is assessed based on the condition, size, rarity, conservation, and legal status. The value of fauna is assessed on its biodiversity value, legal status, and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

Using the evaluation criteria as described above, the habitats and species identified as being present or potentially present within the Site or in the immediate vicinity of the Proposed Development were assessed. As per the NRA guidelines, impact assessment is only undertaken of KERs (i.e., those receptors evaluated as 'Locally Important (higher value)' or higher.

5.2.6.1 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 5-2 and are taken

from the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' published by the NRA (2009), now Transport Infrastructure Ireland (TII).

Table 5-2: Description of values of ecological resources based on geographic hierarchy of importance (NRA, 2009).

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.
	- 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 Acts; 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;

Importance	Criteria
	○ 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 Biodiversity Action Plan (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)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP if this has been prepared. - Resident or regularly occurring populations (assessed to be important at the Local level) 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; - 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.

5.2.6.2 Impact Assessment Criteria

Once the value of the identified 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, 2009; 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 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.

5.2.6.2.1 Criteria used to Define Quality of Effects

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects (Table 5-3).

Table 5-3: 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).

5.2.6.2.2 Criteria used to Define Significance of Effects

European Commission (EC) Guidance on EIAR (EC, 2017) states that assessment of significance should be determined using appropriate, clear, and unambiguous criteria which take "*the characteristics of the impact and the values associated with the environmental issues affected into account"*. Consequently, in line with the EPA EIAR Guidelines (EPA, 2022), the following terms are defined when quantifying the significance of impacts (Table 5-4)

Table 5-4: 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

5.2.6.2.3 Criteria used to Define Duration of Effects

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects (Table 5-5).

Table 5-5: 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

5.2.7 Limitations

An extensive search of available datasets for records of rare and protected species within proximity to 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.

The breeding bird survey undertaken on Site was late in the season however in combination with the precautionary approach this is not deemed a significant limitation.

No limitations were encountered which would prevent robust conclusions being drawn as to the potential impacts of the Proposed Development.

5.3 The Existing and Receiving Environment (Baseline Situation)

5.3.1 Site Overview

The Site is located at Cornamaddy and Ballykeeran, Athlone, Co. Westmeath. The Site is bound to the south and west by agricultural fields, to the north by an unnamed local road and to the easy by Blyry Court. The Site consists of a number of fields currently used for grazing horses with boundary treelines and hedgerows.

5.3.2 Geology, Hydrology and Hydrogeology

The Site of the Proposed Development is within the Upper Shannon catchment (26E) WFD catchment and the Shannon [Upper]_SC_090 sub catchment (EPA, 2023).

The Shannon (Upper)_110 river (hereafter referred to as the Garrynafela Stream) (EPA Segment Code: 26_1675) transects the Site, flowing from east to west before flowing in a northern direction along the western boundary of the Site. From here the Garrynafela Stream flows in a northern direction for approximately 1.7 river km towards Ballaghkerran bay (IS_SH_26_750d) and eventually to Lough Ree. The Garrynafela Stream was assigned a WFD status of *Poor* and the waterbody is *At Risk* of not meeting its WFD status objectives

(EPA, 2023). Ballaghkeeran bay is assigned a WFD status of *Moderate* and the lake is *Not At Risk* of not meeting its WFD status objectives. Ballaghkeeran bay is closely connected to Killinure Lough (IE_SH_26_750b), Coosan Lough (IE_SH_26_750c) and Lough Ree (IE_SH_26_750a) and together they form Lough Ree SAC and Lough Ree SPA (EPA, 2023).

The Site is situated on the Athlone Gravels groundwater body (IE_SH_G_246). The groundwater body has a status of *Good* and is *Not At Risk* of not meeting its WFD objectives (EPA, 2023). Based on the Geological Survey of Ireland (GSI) database, the bedrock beneath the Site is mapped as the *Waulsortian Limestone Formation* (Stratigraphic Code: WA) (New Code: CDWAUL), which comprises *massive unbedded lime-mudstone* (GSI, 2023). The groundwater rock units are described as *Dinantian Pure Unbedded Limestones* (GSI, 2023). The GSI (2023) has classified the aquifer beneath the Site as a *Locally Important Aquifer (LI) – Bedrock which is moderately productive only in local zones*. The groundwater vulnerability rating assigned to the groundwater beneath Site varies from *Moderate* to *High* (GSI, 2023).

5.3.3 Designated Sites

Impacts to designated sites can occur if there is a viable pathway between the source (the Construction and Operational Phases of the Proposed Development) and the receptor (the habitats and species for which a site has been designated). The most common pathway for impacts is surface water, for example if a pollutant is washed into a river and carried downstream into a designated site. Other potential pathways include groundwater, air or land. The zone of effect for hydrological impacts can be several kilometres but for air and land it is rarely more than one hundred metres. The magnitude of impacts (e.g., the concentrations of pollutants) generally decreases as the distance between the source and the receptor increases.

Details of the key ecological features of the designated sites within the ZOI of the Proposed Development are presented in Table 5-6 below. The results of this preliminary screening concluded that there is a total of ten SACs, three SPAs, seventeen pNHAs and four NHAs located within the precautionary ZOI of the Site (Figure 5-1 and Figure 5-2). The distances to each site listed are taken from the nearest possible point of the Proposed Development boundary to the nearest possible point of each designated site. Designated sites outside of this 15km radius were also considered but are deemed to be either; located a considerable physical distance inland; separated by a significant buffer; and/or located within different catchment zones to the Proposed Development (i.e., no S-P-R linkage exists).

Table 5-6: Designated sites of conservation importance within the precautionary ZOI of the Proposed Development.

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
SAC			
Lough Ree SAC (000440)	[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-	0.9km	Yes – Potential impact via the Garrynafela Stream. Refer to NIS accompanying this application.

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
	Brometalia) (* important orchid sites) [7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7230] Alkaline fens [8240] Limestone pavements [91D0] Bog woodland [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [1355] Otter (*Lutra lutra*).		
Crosswood Bog SAC (002337)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration	2.6km	None – Refer to AA Screening Report accompanying this application.
River Shannon Callows SAC (000216)	[6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6510] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [7230] Alkaline fens [8240] Limestone pavements [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [1355] Otter (*Lutra lutra*).	3km	
Carn Park Bog SAC (002336)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration	3.9km	
Ballynamona Bog and Corkip Lough SAC (002339)	[3180] Turloughs [7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion [91D0] Bog woodland	11.4km	
Castlesampson Esker SAC (001625)	[3180] Turloughs [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	11.4km	
Pilgrim's Road Esker SAC (001776)	[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	11.4km	
Mongan Bog SAC (000580)	[7110] Active raised bogs [7120] Degraded raised bogs still capable of natural regeneration [7150] Depressions on peat substrates of the Rhynchosporion	11.8km	
Fin Lough (Offaly) SAC (000576)	[7230] Alkaline fens [1013] Geyer's Whorl Snail (*Vertigo geyeri*)	13.4km	

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
Lough Funshinagh SAC (000611)	[3180] Turloughs [3270] Rivers with muddy banks with Chenopodion p.p and Bidention p.p vegetation.	13.4km	
SPA			
Lough Ree SPA (004064)	[A004] Little Grebe (*Tachybaptus ruficollis*) [A038] Whooper Swan (*Cygnus cygnus*) [A050] Wigeon (*Anas penelope*) [A052] Teal (*Anas crecca*) [A053] Mallard (*Anas platyrhynchos*) [A056] Shoveler (*Anas clypeata*) [A061] Tufted Duck (*Aythya fuligula*) [A065] Common Scoter (*Melanitta nigra*) [A067] Goldeneye (*Bucephala clangula*) [A125] Coot (*Fulica atra*) [A140] Golden Plover (*Pluvialis apricaria*) [A142] Lapwing (*Vanellus vanellus*) [A193] Common Tern (*Sterna hirundo*) [A999] Wetland and Waterbirds	0.9km	Yes – Potential impact via the Garrynafela Stream. Refer to NIS accompanying this application.
Middle Shannon Callows SPA (004096)	[A038] Whooper Swan (*Cygnus cygnus*) [A050] Wigeon (*Anas penelope*) [A122] Corncrake (*Crex crex*) [A140] Golden Plover (*Pluvialis apricaria*) [A142] Lapwing (*Vanellus vanellus*) [A156] Black-tailed Godwit (*Limosa limosa*) [A179] Black-headed Gull (*Chroicocephalus ridibundus*) [A999] Wetland and Waterbirds	3km	None – Refer to AA Screening Report accompanying this application.
Mongan Bog SPA (004017)	[A395] Greenland White-fronted Goose (*Anser albifrons flavirostris*)	12km	None – Refer to AA Screening Report accompanying this application.
pNHA[5]			
Lough Ree pNHA (000440)	See QI of Lough Ree SAC and SPA.	0.9km	Yes - potential pathway via the Garrynafela Stream.
Crosswood Bog pNHA (000678)	See QI of Crosswood Bog SAC.	2.6km	None – No impact pathway between the Site and this pNHA.
River Shannon Callows pNHA (000216)	See QI of River Shannon Callows SAC and SPA.	3km	None – Refer to AA Screening Report accompanying this application.
Walterstown Lake pNHA (001732)	Walterstown Lake lies between Carraun Hill and a peat bog. There is an active peat formation along a half or two thirds of the lake margin. This	3.7km	None – No impact pathway between the Site and these pNHAs.

[5] Where available, brief site synopses are provided for the pNHAs. These synopsis are available from the NPWS (https://www.npws.ie/protected-sites/nha). It is noteworthy that these synopses are based in many cases on old survey data and may not accurately reflect the status of the site at the current time.

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
	peaty shore is in sharp contrast to the calcium-rich water that enters the lake from the surrounding limestone gravel drift. The lake is in a state of flux. There are extensive fen and species-rich reed bed areas, areas calcareous marshes and woodlands. As may be expected with this mixture of different habitats, birds and invertebrates are well represented on the site.		
Carn Park Bog pNHA (000676)	See QI of Carn Park Bog SAC.	4km	
Castlesampson Esker pNHA (001625)	See QI of Castelsampson Esker SAC.	11km	
Ballynagarbry pNHA (001713)	This esker is one of the most striking in the Moate area of Westmeath and is more complex than a simple linear ridge. Several grassy hills occur and some of their axes are at an angle to the main line of the esker. Recent years have seen a dramatic decline in the floristic richness of the site as a result of 'improvement for agriculture' however the site remains of importance and given the right balance of grazing, fertilisation and scrub clearance it could regain its former splendour.	11.1km	
Doon Esker Wood pNHA (001830)	Doon Esker Wood is a long narrow strip of semi-natural woodland along the crest of a steep-sided esker ridge. Semi-natural woodland on esker ridges is not common in the region. The narrow strip of woodland has ground flora containing many features of the original ancient woodland on site.	11.7km	None – No impact pathway between the Site and these pNHAs.
Mongan Bog pNHA (000580)	See QI for Mongan Bog SAC and SPA.	11.8km	
Pilgrim's Road Esker pNHA (001776)	See QI for Pilgrim's Road Esker SAC.	11.9km	
Clonfinlough Esker pNHA (000892)	Clonfinlough Esker is a long ridge of glacial till which runs from Esker Hill towards Clonmacnoise. As a geomorphological feature this relict of the retreating ice is of great importance. The well drained calcium rich soils of the esker also support interesting species-rich vegetation.	13.1km	

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
	Although recent agricultural practices have now diminished the ecological value of the site, it still supports vestiges of the former species-rich grassland, especially on the steeper slopes.		
Fin Lough (Offaly) pNHA (000576)	See QI of Finn Lough (Offaly) SAC.	13.3km	
Lough Funshinagh pNHA (000611)	See QI of Funshinagh SAC.	13.3km	
Lough Slawn pNHA (001443)	Lough Slawn is a small lough on the shores of Lough Ree. The underlying geology is of Carboniferous limestone, and the influence of calcium enrichment is quite clear throughout the site with species such as great fen-sedge (*Cladim mariscus*) in the marsh and swamp areas. The same base enrichment is evident in the field to the south.	14.3km	
Clonlyon Glebe Bog pNHA (000893)	Clonlyon Glebe Bog is a small, domed bog. The main feature of the dome at present is the presence of numerous and efficient drains over 80% of the surface. Two areas of good hummock and hallow growth pattern occur, much of the bog surface shows bare peat, a result of burning and drying out.	14.6km	
Feacle Turlough pNHA (001634)	Feacle Turlough lies in an uneven terrain of glacial deposits. The value of this turlough is that it is at the dry end of the wetness gradient but seems to be unaffected by an artificial drainage. It is also unusual as it is surrounded by gravelly deposits which may affect its hydrology. Its vegetation is limited in type, but the zonation on the surrounding glacial hills is of interest. The occurrence of red data book species northern yellow-cress (*Rorippa islandica*) and also fat duckweed (*Lemna gibba*) adds to the importance of the site.	14.8km	
Lough Nanag Esker pNHA (000910)	Situated between the River Shannon callows and a raised bog undergoing commercial peat extraction, the site comprises an esker ridge composed of glacial gravels. A small lake occurs in the south-easter section. Much of what	14.9km	

Site Name & Code (Receptor)	Qualifying Interests	Distance to Proposed Development	Potential Pathway to receptors
	would formerly have been good quality dry calcareous grassland has been lost through grassland improvement. Two such areas support small populations of the rare and legally protected (Flora Protection Order, 1987) green-winged orchid (*Orchis morio*).		
NHA			
Carrickynaghtan Bog NHA (001623)	Peatlands	5.1km	None – No impact pathway between the Site and these NHAs.
Clonydonnin Bog NHA (000565)	Peatlands	10.1km	
Ballynagrenia and Ballinderry bog NHA (000674)	Peatlands	12.8km	
Forthill Bog NHA (001448)	Peatlands	14.8km	

5.3.3.1 Source-Pathway-Receptor linkages

A designated site will only be at risk from likely significant effects where a S-P-R link exists between the Proposed Development and the site.

The following designated sites have been identified as being connected to the Proposed Development by S-P-R linkages:

- Lough Ree SAC.
- Lough Ree SPA.
- Lough Ree pNHA.

A hydrological connection was identified between the Site and Lough Ree via the Garrynafela Stream. A detailed assessment of potential impacts relating to European sites is provided in the AA Screening Report (Enviroguide, 2023a) and NIS (Enviroguide, 2023b) that accompany this application under a separate cover. The AA Screening Report concluded that likely significant effects to Lough Ree SAC and Lough Ree SPA, as a result of surface water pathways could not be screened out, and as such, a NIS was prepared. The NIS details the mitigation measures required to negate any likely significant effects on these European sites and concludes that no significant effects are likely to occur, once the mitigation as detailed in the NIS are implemented in full. The conclusions of the NIS also apply by proxy to Lough Ree pNHA, which overlaps with Lough Ree SAC and Lough Ree SPA. As these designated sites have been assessed (and any significant effects addressed through mitigation) in the AA Screening and NIS Reports that accompany this application, they will not be assessed further in this Chapter.

The River Shannon Callows pNHA lies 3km southwest of the Site and maintains a weak hydrological connection with the Site. This hydrological connection is deemed insignificant given that the Garrynafela Stream flows away from the Site in a northern direction and must flow over 12 river km from the Site to reach this pNHA (via waterbodies such as the Garrynafela Stream, Ballaghkerran Bay, Killinure Lough, Lough Ree and the River Shannon). Any potential surface water discharges containing sediment, silt and/or pollutants arising from the Construction and Operational Phase of the Proposed Development would become diluted to non-discernible levels over the course of this distance.

One Ramsar sites is located within the ZOI of the Proposed Development, Mongan Bog lies 12km southwest of the Site. There is no impact pathway between the Site and this Ramsar site due to the significant intervening distance between the Proposed Development and this protected site and the lack of a hydrological connection.

No other pathways (land, air, hydrology) exist between the Site and any other designated site. The distances between the Site and the remaining designated sites within the ZOI of the Proposed Development are sufficient to exclude the possibility of significant effects arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction and Operational Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during the Construction and Operational Phase; increased human presence at the Site during the Construction and Operational Phase; and increased human presence at local designated sites due to the increased population in the area.

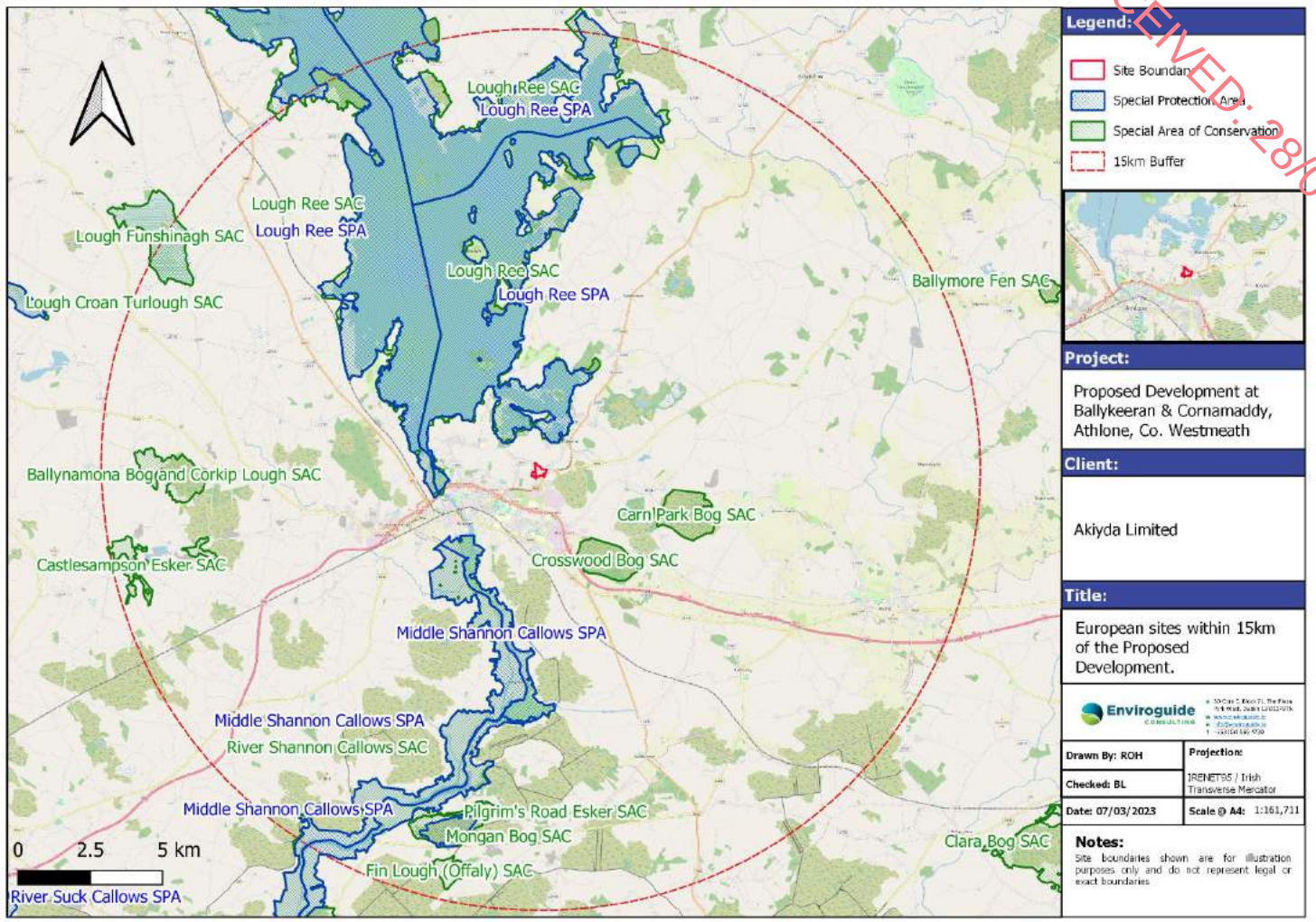

Figure 5-1: European sites within 15km of the Proposed Development

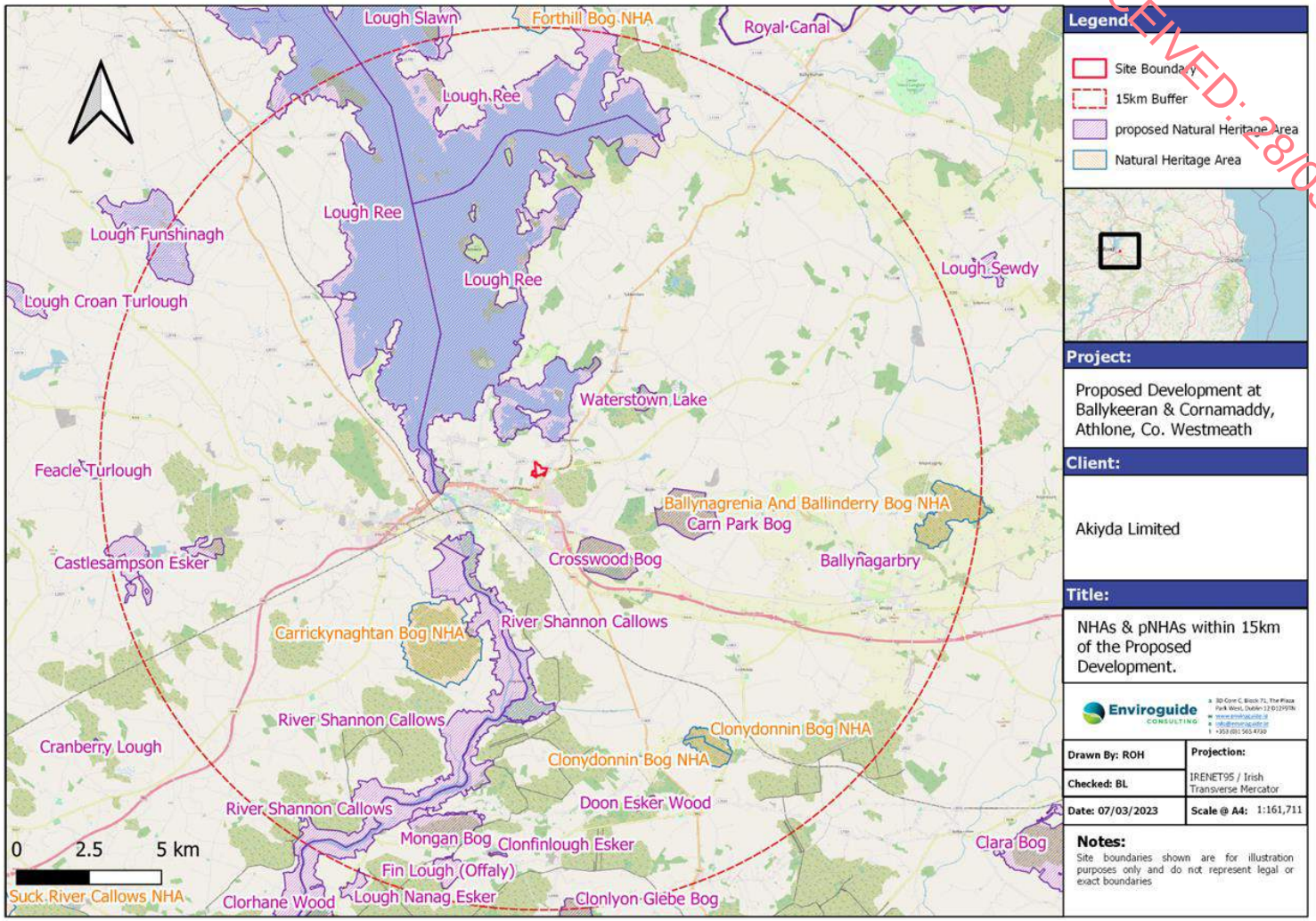

Figure 5-2: pNHAs and NHAs within 15km of the Proposed Development

5.3.4 Habitats and Flora

The habitats within the Site are coded and categorised for the most part as per Fossitt (2000) and are described in detail in the following sections. The habitat map of the Site is shown in Figure 5-3 and the habitats at the Site are listed and described below:

- WL1 – hedgerows.
- WL2 – treelines.
- WD1 – mixed broadleaved woodland.
- WS2 – immature woodland.
- WS1 – scrub.
- GA1 – improved agricultural grassland.
- GS2 – dry meadows and grassy verges.
- GS4 – wet grassland.
- FW2 – depositing/lowland rivers.
- FW4 – drainage ditch.

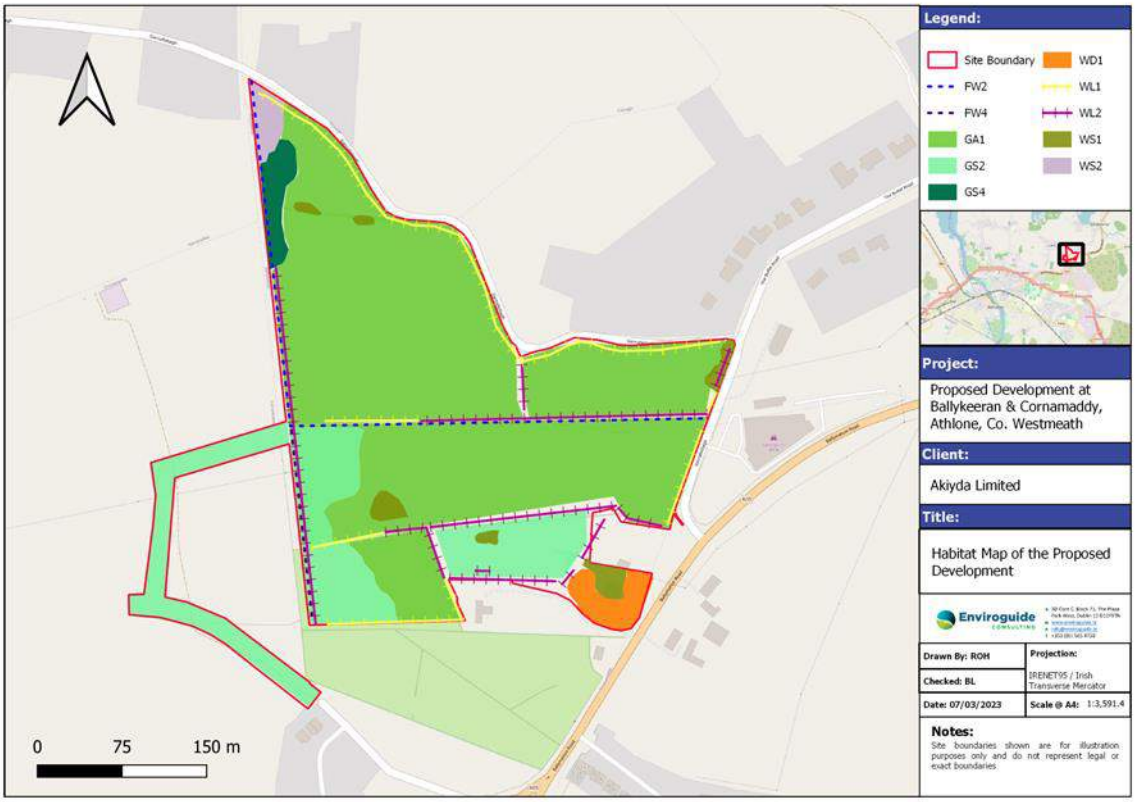

Figure 5-3: Habitat map of the Proposed Development Site

5.3.4.1.1 WL1 – hedgerows and WL2 – treelines

The various fields on Site are bound by hedgerow (Figure 5-4) and treeline (Figure 5-5) habitats. These hedgerows and treelines are predominantly mature in nature and contain common species including hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus*), willow (*Salix* spp.), ash (*Fraxinus*

excelsior), elder (*Sambucus nigra*) and oak (*Quercus robur*). Non-native sycamore was also present within the various treelines on Site. Although the species recorded within the hedgerows and treelines on Site are common and widespread, these linear habitats are considered of High ecological value at a local scale (i.e., Local Importance (Higher Value)); due to the size and maturity of the trees present and the habitat connectivity provided by these features at the Site.

Figure 5-4: WL1 – hedgerow habitat on Site.

Figure 5-5: WL2 – treeline habitat on Site.

5.3.4.1.2 WD1 – mixed broadleaved woodland

A small area of mixed semi-mature broadleaved woodland is present within a derelict portion of the Site to the southeast (Figure 5-6). Some ornamental trees are present within this habitat that were likely planted in the past but are now suppressed by the larger neighbouring self-seeded trees. Species present within this habitat include whitebeam (*Sorbus aria*), ash, hawthorn, wild cherry (*Cerasus avium*), rowan (*Sorbus aucuparia*), black poplar (*Populus nigra*) and willows. Non-native Norway maple and sycamore is also present within this habitat. The species present within this habitat are common and widespread in Ireland. Due to the size and maturity of the trees present within this habitat and the mixture of species present, this habitat is considered of Local Importance (Higher Value).

Figure 5-6: WD1 – mixed broadleaved woodland habitat (background) and GS2 – dry meadows and grassy verges habitat (foreground).

5.3.4.1.3 WS2 – immature woodland

A small area of immature woodland lies at the northwest corner of the Site, this woodland is dominate by naturally regenerated goat willow (*Salix caprea*) and lies adjacent to the Garrynafela Stream (Figure 5-7). The understorey of this immature woodland was dominated by purple loosestrife (*Lythrum salicaria*), ivy and great willowherb (*Epilobium hirsutum*). This habitat provides a band of woodland cover adjacent to the Garrynafela Stream and links up with the surrounding hedgerows and treelines on Site. This habitat contributes to the overall tree cover of the area and is considered of Local Importance (Higher Value).

Figure 5-7:WS2 – willow dominated immature woodland on Site.

5.3.4.1.4 WS1 – scrub

Small areas of scrub habitat are present at the Site containing bramble, nettle (*Urtica dioica*), great willowherb, hawthorn and willow saplings (Figure 5-8). Although this habitat provides potential nesting, foraging and shelter to small mammals and birds, it is common and widespread and is not particularly species rich. This habitat is considered of Local Importance (Lower Value).

Figure 5-8:WS1 – scrub habitat on Site.

5.3.4.1.5 GA1 – improved agricultural grassland

The Site is currently used for grazing horses and improved agricultural grassland is the dominant habitat on Site (Figure 5-9). The fields on Site are on the less-intensively managed end of improved agricultural grassland habitat and were generally species poor. Common and widespread species recorded here include rye grasses (*Lolium* spp.), white clover (*Trifolium repens*), common ragwort (*Jacobaea vulgaris*), nettle, spear thistle (*Cirsium vulgare*), ribwort plantain (*Plantago lanceolata*), dandelion (*Taraxacum vulgaria*) and dock (*Rumex obtusifolius*). This habitat is currently heavily grazed by horses, widespread in the surrounding area and has low ecological value, this habitat is therefore considered of Local Importance (Lower Value).

Figure 5-9: GA1 - improved agricultural grassland on Site.

5.3.4.1.6 GS2 – dry meadows and grassy verges

This habitat has developed in areas on Site where a reduction in grazing levels has enabled species such as great willowherb, nettle, spear thistle, common ragwort, cleavers (*Galium aparine*), meadowsweet (*Filipendula ulmaria*) and creeping buttercup (*Ranunculus repens*) to dominate (Figure 5-10). Although this habitat contains a good herb component is not particularly species rich and is common in the surrounding area and therefore considered of Local Importance (Lower Value).

Figure 5-10: GS2 – dry meadows and grassy verges habitat on Site.

5.3.4.1.7 GS4 – wet grassland

A small area of wet grassland lies at the northwestern boundary of the Site adjacent to the Garrynafela Stream (Figure 5-11). Species recorded within this habitat include water mint (*Mentha aquatica*), creeping buttercup, meadowsweet, creeping buttercup, silverweed (*Potentilla anserina*) and creeping bent (*Agrostis stolonifera*). Although this habitat on Site is small in size the wet grassland habitat has secondary value as habitat fauna. The wet grassland at the Site is considered of Local Importance (Higher Value).

Figure 5-11: GS4 - wet grassland habitat on Site.

5.3.4.1.8 FW2 – depositing/ lowland river and FW4 – drainage ditch

The Garrynafela Stream is mapped by the EPA as running along the western Site boundary and transecting the Site, flowing east to west and south to north. This waterbody was heavily shaded in places due to the boundary treelines and hedgerows (Figure 5-12). A drainage ditch lies south of this Stream along the south-easter boundary and is hydrologically connected. Given the connectivity between the Garrynafela Stream and Lough Ree, the Garrynafela Stream and drainage ditches on Site are considered of High ecological value at a local scale i.e., Local Importance (Higher Value).

Figure 5-12: FW2 – depositing / lowland river (the Garrynafela Stream)

5.3.5 Species and Species Groups

5.3.5.1 Flora

5.3.5.1.1 Rare and Protected Flora

Species records from the NBDC online database and the Flora Protection Order - Bryophytes Map Viewer[6] were studied for the presence of rare of protected flora. Large white-moss (*Leucobryum glaucum*) was recorded within the 2km grid square in 2007, this species is protected under the Habitats Directive.

No rare or protected flora were identified within the Site during surveys.

5.3.5.1.2 Invasive Plant Species

Species records from the NBDC online database were studied for the presence of invasive plant species. One invasive species is listed for the 2km grid square N04R, "High" impact species, Japanese knotweed was recorded in 2019. Japanese knotweed was not identified on Site during surveys.

Two non-native species were recorded on Site, sycamore (*Acer pseudoplatanus*) was recorded within the treelines on Site and Norway maple (*Acer platanoides*) was recorded within the mixed broadleaved woodland habitat. According to the NBDC, sycamore is a medium impact invasive and Norway maple is a low risk invasive.

[6] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e

5.3.5.2 Mammals (excl. bats)

Records of terrestrial mammals were retrieved from the NBDC online database, one mammal was recorded within the 2km grid square N04R, red fox (*Vulpes vulpes*). Red fox are common in urban and rural environments and likely visit the Site, however this species is not of conservation concern in Ireland.

In Ireland the Wildlife Act, 1976 and the Wildlife Amendment Act, 2000 are the principal statutory provisions providing for the protection of Wildlife and the control of activities which may impact adversely on the conservation of wildlife. Certain mammal species (i.e., otter (*Lutra lutra*)) are also listed on Annex II of the EU Habitats Directive and afforded further protection.

The habitats on Site are of variable value to mammals. The hedgerows, scrub and grassland habitats provide potential habitat for small mammals such as hedgehog (*Erinaceus europaeus*) and pygmy shrew (*Sorex minutus*). Potential habitat for Irish stoat (*Mustela erminea hibernica*) occurs at the Site (treeline and section of mixed broadleaved woodland), although not directly recorded during the surveys this small mammal may utilise the Site on an occasional basis. These small mammals are included as a KER and assessed further in this Chapter. Irish stoats favoured prey species, rabbit (*Oryctolagus cuniculus*), was observed on Site during surveys and rabbit droppings were noted adjacent to hedgerows at the northeast of the Site. Rabbit is a non-native species and is not of conservation concern, they will not be included as a KER.

Suitable habitat for badger (*Meles meles*) exists on Site (scrub, hedgerows) however no signs of this species e.g., setts, prints or latrines were present during surveys. As badgers are known to utilise the area in the immediate vicinity of the Site, badgers are included as a KER for this assessment following a precautionary approach. No otter holts, nor any other evidence of otter, was found during the ecological surveys of the Site. Although it is possible that the Garrynafela Stream at the Site is used occasionally by otters, it is highly unlikely to support a resident or regularly occurring population due to a lack of evidence of otter signs at the Garrynafela Stream during surveys and the lack of prey availability for otter within the waterbody. As otter are listed as a QI for Lough Ree SAC (located less than 1kmk for the site), otter are included as a KER for this assessment. Potential habitat for red squirrel (*Sciurus vulgaris*) and pine marten (*Martes martes*) is present within the woodland and treeline habitats on Site. Due to the open nature of the majority of the Site, significant populations of these species are not expected however they are included as a KER following a precautionary approach. The Irish hare (*Lepus timidus hibernicus*) is common and widespread in Ireland and hares may use parts of the Proposed Development Site on an occasional basis. No hares were encountered during surveys and given the vast quantities of suitable habitat for this species in the immediate vicinity of the Proposed Development, the Site is considered of negligible importance to hares.

Hedgehog, pygmy shrew, Irish stoat, badger, otter, pine marten and red squirrel are considered as KERs in this assessment.

5.3.5.3 Bats

All bat species found in Ireland are protected under the Wildlife Act (1976 to 2021) and Annex IV of the Habitats Directive. The lesser horseshoe bat is further protected under Annex II. No bat species were recorded by the NBDC within the relevant 2km grid square.

5.3.5.3.1 Habitat Evaluation

According to the NBDC maps landscape suitability for bats based on Lundy *et al*., (2011), which provides a visual map of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species; the area surrounding the Site of the Proposed Development carries an overall bat suitability score of 41.22 out of 100. The species with the highest individual suitability scores for the area encompassing the Site are common common pipistrelle (*Pipistrellus pipistrellus)*, Leisler's bat (*Nyctalus leisleri)* and brown long-eared bat (*Plecotus auratus),* with 58, 55 and 53, respectively.

Treelines and hedgerows within the Site were identified as holding 'Moderate' foraging and commuting suitability to bats according to Collins (2016) i.e., '*Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water'*.

5.3.5.3.2 Bat Activity Surveys

Three bat species were recorded during the bat surveys at the Proposed Development Site, common pipistrelle, Leisler's bat and soprano pipistrelle (*Pipistrellus pygmaeus*) (Table 5-7). The most frequently recorded species was soprano pipistrelle (accounting for 81.75% of records). Bat activity was noted to be high along the western Site boundary treeline, activity here was indicative of multiple foraging bats with multiple feeding buzzes (rapid calls emitted before capturing prey) and social calls recorded by the bat detector in this area (Figure 5-13 and Figure 5-14). Despite repeated walking transects carried out elsewhere on Site for the duration of the surveys, activity elsewhere on Site was noted to be generally low.

Table 5-7. Summary of bat activity at the Site on the 30th of August and 26th of September 2022.

Species Common Name	Species Scientific Name	Number of Passes	Number of Calls
30/08/2022			
Soprano pipistrelle	*Pipistrellus pygmaeus*	63	1194
Leisler's bat	*Nyctalus leisleri*	9	130
Common pipistrelle	*Pipistrellus pipistrellus*	12	198
26/09/2022			
Soprano pipistrelle	*Pipistrellus pygmaeus*	49	844
Leisler's bat	*Nyctalus leisleri*	4	27

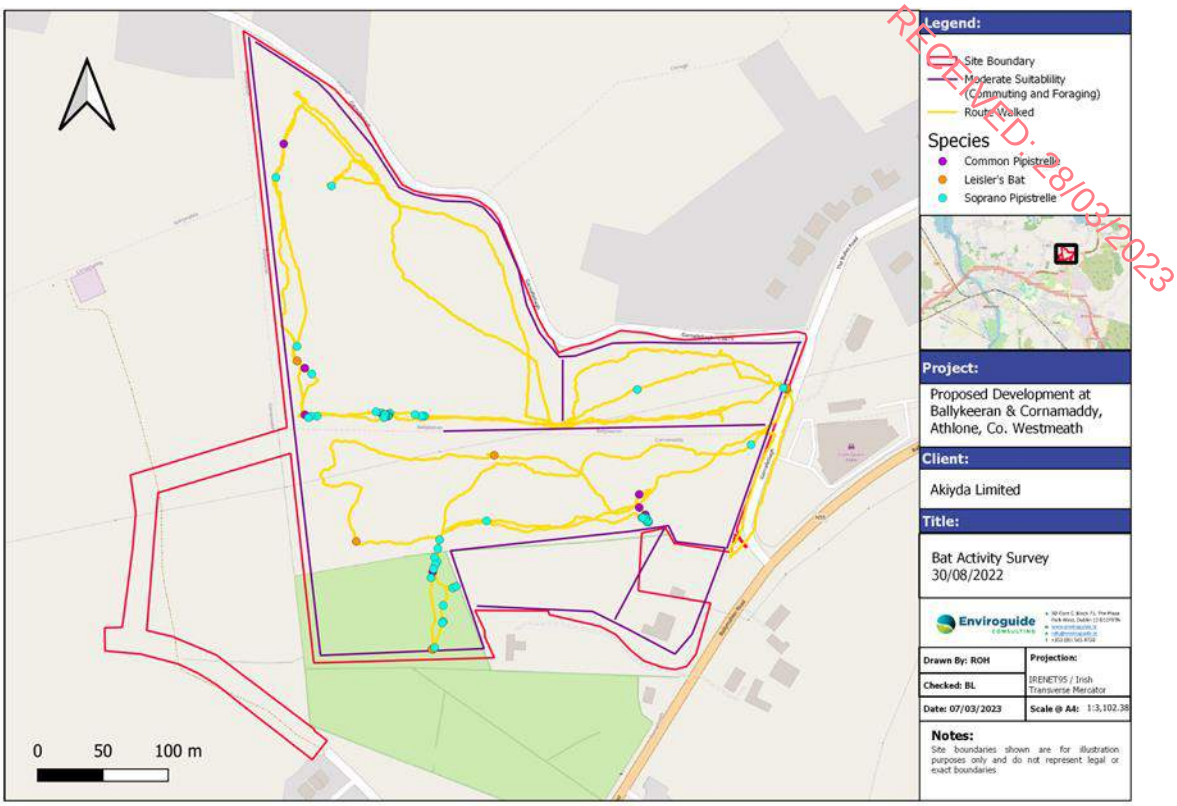

Figure 5-13. Bat survey results – 30th August 2022 (species points indicate bat passes and not necessarily individual bats). The roadway to the west of the applicant's boundary is included in the redline boundary for access requirements however this area was previously granted planning permission for the adjacent planning application and was not walked during the bat activity surveys.

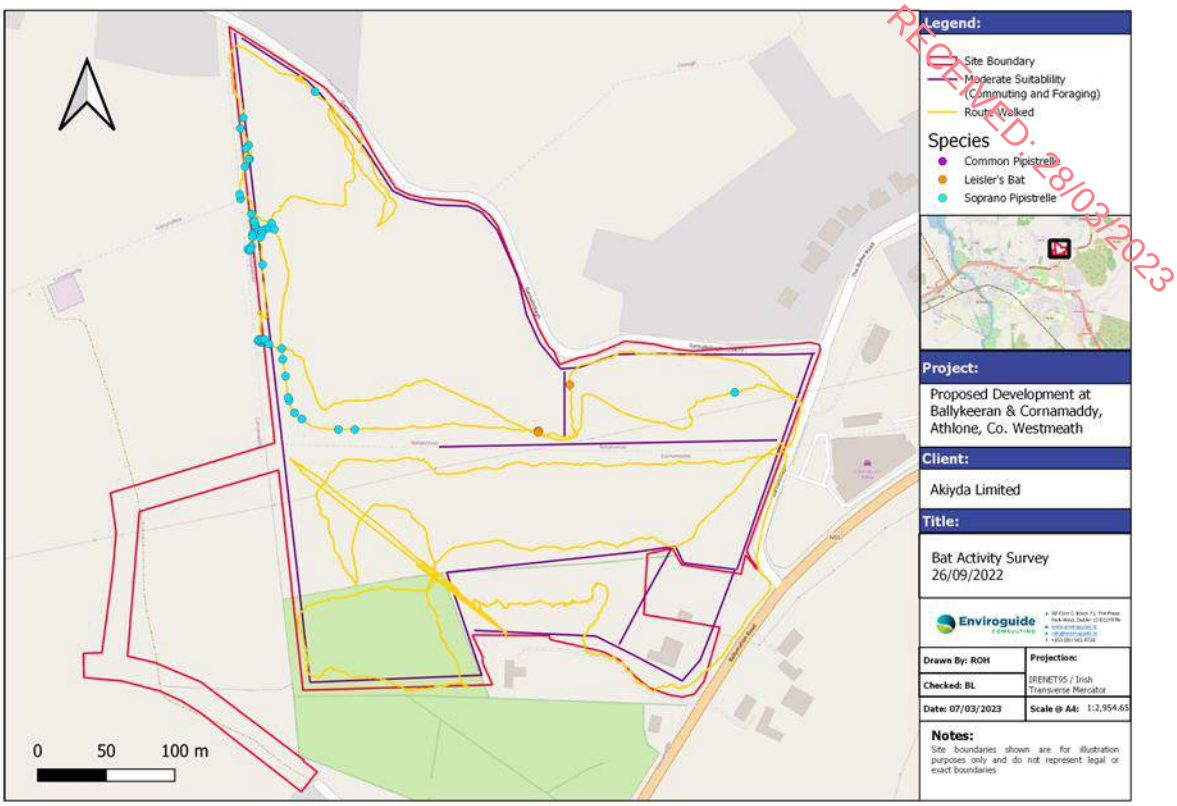

Figure 5-14 Bat survey results – 26th September 2022 (species points indicate bat passes and not necessarily individual bats). The roadway to the west of the applicant's boundary is included in the redline boundary for access requirements however this area was previously granted planning permission for the adjacent planning application and was not walked during the bat activity surveys.

5.3.5.3.3 Potential Bat Roost Assessments

Two trees (T1894 and T1895) at the northeast of the Site (Figure 5-15) were identified during daytime walkover surveys of the Site as holding 'moderate' roost potential due to the presence of potential roost features (ivy (*Hedra helix*) lattice, rot holes). No evidence of bat emergence or elevated bat activity in this area was noted during the bat activity surveys in August and September 2022.

Figure 5-15. Tree on Site (T1894) with PRF (ivy lattice and rot hole).

As no targeted emergence surveys were completed, a precautionary approach is applied to roosting bats. The Site is considered of Local Importance (Higher value) to local bats and they are considered a KER for this assessment.

5.3.5.4 Birds

The Birds of Conservation Concern in Ireland (Gilbert at al., 2021) established the appropriate Red-Amber-Green listing category and individual species are assessed against a range of quantitative criteria. These criteria assess a number of important characteristics of populations such as changes in range and population size in Ireland, Europe and globally. Meeting one or more of these criteria qualifies a species for the relevant list with each species being listed according to the highest category for which they qualify. Amber-listed species include species that have an unfavourable status in Europe, have moderately declined in abundance or range, a very small population size, a localized distribution, or occur in internationally important numbers.

Three bird species were recorded within the 2km grid square, red listed common snipe (*Gallinago gallinago*), amber listed starling (*Sturnus vulgaris*) and green listed jackdaw (*Corvus monedula*) as per the *Birds of Conservation Concern in Ireland 2020-2026* (Gilbert et al., 2021).

5.3.5.4.1 Breeding bird surveys

Breeding bird surveys commenced on the morning of the 11th and 19th of July 2022 at the Site. Bird activity within the Site was recorded using a combination of direct sightings and identification of songs and calls. Twenty-nine species were recorded during the survey on the 11th of July and thirty-one species were recorded during the survey on the 19th of July. All species recorded during the survey are shown below in Table 5-8. Seven species observed

on Site are on the Amber List of the *Birds of Conservation Concern in Ireland*; two species are on the Red List.

Table 5-8: Results of the breeding bird survey of the Site on the 11th and 19th of July 2022.

Species	BoCCI status	Survey 1 (11/07/22) and/or survey 2 (19/07/22)	Notes
Blackbird *(Turdus merula)*	Green	1 & 2	-
Blackcap *(Sylvia atricapilla)*	Green	1 & 2	-
Bullfinch *(Pyrrhula pyrrhula)*	Green	1 & 2	-
Blue tit (Cyanistes caerules)	Green	1 & 2	Confirmed breeding, recently fledged young.
Chaffinch *(Fringilla coelebs)*	Green	1 & 2	-
Chiffchaff *(Phylloscopus collybita)*	Green	1 only	-
Dunnock *(Prunella modularis)*	Green	1 & 2	-
Feral pigeon *(Columba livia f. domestica)*	Unclassified	2 only	-
Goldcrest *(Carduelis carduelis)*	Amber	1 & 2	-
Goldfinch *(Carduelis carduelis)*	Green	1 & 2	Confirmed breeding, recently fledged young.
Great tit *(Parus major)*	Green	1 & 2	-
Hooded crow *(Corvus cornix)*	Green	1 & 2	-
House martin *(Delichon urbicum)*	Amber	1 & 2	-
House sparrow *(Passer domesticus)*	Amber	1 only	-
Jay *(Garrulus glandarius)*	Green	1 & 2	-
Linnet *(Linaria cannabina)*	Amber	1 & 2	-

Species	BoCCI status	Survey 1 (11/07/22) and/or survey 2 (19/07/22)	Notes
Lesser redpoll *(Acanthis flammea)*	Green	1 & 2	-
Magpie *(Pica pica)*	Green	1 & 2	-
Meadow pipit *(Anthus pratensis)*	Red	1 & 2	-
Pheasant *(Phasianus colchicus)*	Unclassified	2 only	-
Reed bunting *(Emberiza schoeniclus)*	Green	1 & 2	Confirmed breeding, recently fledged young.
Robin *(Erithacus rubecula)*	Green	1 & 2	Confirmed breeding, recently fledged young.
Rook *(Erithacus rubecula)*	Green	1 & 2	-
Sparrowhawk *(Accipiter nisus)*	Green	2 only	-
Starling *(Sturnus vulgaris)*	Amber	1 & 2	-
Stonechat *(Saxicola torquatus)*	Green	1 & 2	Confirmed breeding, recently fledged young.
Swallow *(Hirundo rustica)*	Amber	1 & 2	-
Song thrush *(Turdus philomelos)*	Green `	1 & 2	-
Swift *(Apus apus)*	Red	2 only	-
Whitethroat *(Sylvia communis)*	Green	1 & 2	-
Wren *(Troglodytes troglodytes)*	Green	1&2	Confirmed breeding, recently fledged young.
Willow warbler *(Phylloscopus trochilus)*	Amber	1 & 2	Confirmed breeding, recently fledged young.

During bat surveys of the Site on the 26th of September 2022, a barn owl (*Tyto alba*) was observed on three occasions hunting within the Site lands. The size of a barn owls home range

(area within which barn owls live) depends on the quality of habitat and prey availability. Home ranges in Ireland can be up to 6km from the breeding nest (Lusby & O'Clery, 2014). The rough grassland on Site provides hunting habitat for this species. Barn owls breed in hollows or mature trees, ruined buildings such as castles and can also utilise outbuildings, as no such habitat exists on Site barn owl are not breeding within the Proposed Development Site. Barn owls are a Red Listed species in Ireland due to a significant decline in breeding populations.

Based on the number of species present and the presence of Red and Amber Listed species at the Site, the Site is considered to Local Importance (Higher Value) to local bird populations, and they are considered a KER in this assessment.

5.3.5.4.2 Winter waterbird surveys

Data from the winter waterbird surveys carried out at the Proposed Development Site by Enviroguide Consulting is presented in Table 5-9. Three waterbird species were recorded during the surveys, black-headed gull (*Chroicocephalus ridibundus*), snipe (*Gallinago gallinago*) and grey heron (*Ardea cinerea*). Grey heron and black-headed gull were recorded flying over the Site and were not associated with or utilizing the Site for foraging, roosting or nesting. Small numbers of snipe were recorded foraging in the rank grassland on Site.

Table 5-9. Results of winter waterbird surveys at the Site. Peak counts of relevant species – grey heron (H.), snipe (SN) and black-headed gull (BH). Bird activity on Site is classified using the following BTO activity codes: FL (flyover), FO (foraging).

Month	Date	Peak Counts			Activity (BTO Code)	Additional Notes
		H.	SN	BH		
October	26/10/2022	1	0	0	FL	H flying southwest over the Site.
November	04/11/2022	1	0	0	FL	
December	01/12/2022	0	5	1	SN = FO BH = FL	SN flushed from rank grassland. BH Flying north over the Site.
January	19/01/2022	0	2	1	SN = FO BH = FL	BH flying north over the Site. SN flushed before landing on the far side of the road.
March	02/03/2022	0	0	0	-	No waterbird species were recorded utilizing the Site lands of as flyovers.

5.3.5.5 Fish

No fish species were recorded within the 2km grid square by the NBDC and the section of the Garrynafela Stream at the Site is highly unlikely to support fish. No fish species were identified within the section of the Garrynafela within and adjacent to the Site during surveys. Ballaghkerran Bay, Killinure Lough and Lough Ree are hydrologically connected to the Proposed Development Site via the Garrynafela Stream. Inland Fisheries Ireland (IFI) conducted a fish stock survey of Lough Ree in 2013 which recorded a total of 6 fish species and 1 hybrid species within Lough Ree, perch (*Perca fluviatilis*), roach (*Rutilus rutilus*) , roach

x bream hybrids, brown trout (*Salmo trutta*), eel (*Anguilla anguilla*), pike (*Esox Lucius*) and stone loach (*Barbatula barbatula*) were all recorded. These fish species were not identified within the Garrynafela Stream on Site and are common and widespread throughout Ireland and are present in almost all watercourses, therefore fish are not considered as a KER in this assessment.

5.3.5.6 Amphibians

There are no records on the NBDC database for common frog or smooth newt within the 2km tetrad associated with the Site and no amphibian species were recorded on Site during surveys. Amphibians require suitable aquatic and terrestrial habitats to support them. Amphibian eggs are laid in water and the larvae develop there, outside the breeding season adults and juveniles spend much of their time on land where, generally they need damp or humid conditions.

Flow was present within the Garrynafela Stream at the Site and this waterbody is not considered suitable to support significant populations of amphibians. The wet grassland and scrub on Site provide potential habitat for smooth newt and common frog. The Site is considered of Local Importance (Higher Value) to smooth newt and common frog and these amphibian species are considered as KERs in this assessment.

5.3.5.7 Reptiles

The common lizard (*Lacerta vivipara*) is Ireland's only native reptile species. Due to their reliance on plentiful sunshine, the common lizard hibernates during the winter months, emerging in early March. They may emerge before March in mild winter weather. The common lizard is widely distributed throughout Ireland and have been recorded in a wide range of habitats including woodlands, marshes, bogs, hedgerows and even gardens. The common lizard requires a good habitat structure with open patches for basking and foraging and areas of cover for protection from predators (King et al., 2011). This species is tolerant, to a degree, of habitat disturbance and is relatively tolerant of human presence in rural Ireland. No reptile species were recorded within the 2km grid square N04R.

The Site was assessed for its potential to support common lizard, the grassland, scrub and hedgerows on Site provide potential habitat for this species and the Site is considered of Local Importance (Higher Value) for local lizard populations. Lizard is included as a KER for this assessment.

5.3.5.8 Other species and species groups

5.3.5.8.1 White-clawed crayfish (*Austropotamobius pallipes*)

There are no records of white-clawed crayfish within the 2km National Grid Squares associated with the Proposed Development or within Lough Ree (NBDC, 2023). Due to a lack of evidence of this species in the immediate vicinity of the Site, white-calwed crayfish are not considered as a KER for this assessment.

5.3.5.8.2 Marsh fritillary (*Euphydryas aurinia*)

The marsh fritillary butterfly is listed under Annex II of the EU Habitats Directive and is the only insect protected by law in Ireland. There are no records of this species within the 2km National Grid Squares N04R. Butterfly forms of marsh fritillary are active in May-June and its associated

food plant: devil's bit scabious (*Succisa pratensis)* flower in July-September. The surveys conducted at the Site covered the flowering period of devil's bit scabious, no evidence of the food plant was recorded during Site surveys and they are not considered as a KER for this assessment.

5.3.6 Designated Sites, Habitat and Species Evaluation

The ecological value of designated sites, habitats, flora and fauna associated with the Proposed Development Site are evaluated in Table 5-10. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). KERs are those ecological receptors for which detailed assessment is required, on the basis of ecological value and likely significant impacts. The rationale behind these evaluations is also provided. Ecological resources of below 'Local Importance (higher value)' should not be selected as 'KER' for which detailed assessment is required (NRA,2009).

Table 5-10: Evaluation of designated sites, habitat, flora and fauna associated with the Proposed Development Site.

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated Sites			
Lough Ree SAC and Lough Ree SPA	International and National Importance	**No**	Potential impacts to European sites are addressed in the AA screening and NIS accompanying this application under separate covers.
Lough Ree pNHA	National Importance	**No**	Lough Ree pNHA is hydrologically linked to the Proposed Development via the Garrynafela Stream. The conclusions of the NIS also apply by proxy to Lough Ree pNHA, which overlaps with Lough Ree SAC and Lough Ree SPA
Habitats			
WL1 - hedgerows & WL2 - treelines	Local Importance (Higher Value)	**Yes**	Mature hedgerows and treelines on Site provide potential nesting, resting and foraging habitat for wildlife and forms ecological corridors. Treelines and hedgerows on Site are also considered important in accordance with the Westmeath County Development Plan.
WD1 – mixed broadleaved woodland	Local Importance (Higher Value)	**Yes**	Provides potential nesting, resting and foraging habitat for wildlife. The mixed broadleaved woodland on Site are also considered important in accordance with the Westmeath County Development Plan.
WS2 – immature woodland	Local Importance (Higher Value)	**Yes**	Provides potential nesting, resting and foraging habitat for wildlife. The area of immature woodland on Site is also considered important in accordance with the Westmeath County Development Plan.
WS1 – scrub	Local Importance (Lower Value)	No	May provide some shelter/foraging habitat to local fauna but small quantities of this habitat present at the Site and habitat is common and widespread in the locality.
GA1 – improved agricultural grassland	Local Importance (Lower Value)	No	Common and widespread habitat, which is heavily grazed and not considered to be of biodiversity value.
GS2 – dry meadows and grassy verges	Local Importance (Lower Value)	No	Common and widespread habitat in the locality, this grassland is of low to moderate diversity and not considered to be of biodiversity value in the Site context.
GS4 – wet grassland	Local Importance (Higher Value)	**Yes**	Small area of wet grassland present on Site adjacent to the Garrynafela Stream. The species recorded within this habitat are common and widespread, however this habitat has secondary value as it provides potential habitat for smooth newt and common frog.
FW2 – depositing / lowland river and FW4 – drainage ditch	Local Importance (Higher Value)	**Yes**	The Garrynafela Stream and drainage ditch on Site are hydrologically connected to Lough Ree (SAC, SPA and pNHA) and acts as a corridor to the wider landscape for a variety of species.

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Mammals			
Eurasian badger	Local Importance (Higher Value)	**Yes**	The badger is an adaptable species of lowland grassland and woodland habitats (Marnell et al., 2009). No setts were recorded at the Site during surveys, however, potential habitat for badger is present on Site and badgers are known to utilise lands in the immediate vicinity of the Site. On a precautionary basis, badger is considered as a KER.
Small mammals (hedgehog and pygmy shrew)	Local Importance (Higher Value)	**Yes**	Although not directly recorded on Site, hedgehog and pygmy shrew likely utilise the Proposed Development Site. Potential nesting/foraging habitat for hedgehog is present within the scrub, hedgerow, and grassland habitats.
Irish stoat	Local Importance (Higher Value)	**Yes**	Potential suitable habitat present on Site within the treelines, woodland and scrub habitats and rabbit prey species are present on Site.
Eurasian red squirrel & pine marten	Local importance (Lower Value)	**Yes**	Although not directly recorded on Site, the mixed broadleaved woodland and treelines on Site provides potentially suitable habitat for these species. The habitats on Site are unlikely to provide significant populations of these species however they are considered as KERs following a precautionary approach.
European otter	Local Importance (Higher Value)	**Yes**	The Garrynafela Stream is considered unsuitable for habitat for Otter given its restricted size and low flow rates, however as otter are a QI for Lough Ree SAC, they are considered a KER.
Irish hare	Local Importance (Lower Value)	No	The improved agricultural grassland habitats at the Site are considered suitable for this species, however, no evidence of Irish hare was found during surveys.
Red fox	Local Importance (Lower Value)	No	Although this species is likely to occur at the Site, it is not considered to be of conservation concern and therefore is not assessed further in this report.
Bat Assemblage	Local Importance (Higher Value)	**Yes**	Potential habitat at the Site of the Proposed Development for bats.
Birds			
Bird assemblage	Local Importance (Higher value)	**Yes**	The treelines, hedgerows, grassland and scrub habitat on Site provide potential breeding and foraging habitat for these species. Based on the winter waterbird surveys of the Site the Site is not considered to provide significant ex-situ habitat for any waterbird species.
Amphibians and Reptiles			
Common frog & smooth newt	Local Importance (Higher Value)	**Yes**	The grasslands and scrub habitats on Site provide potential habitat for this species.
Common lizard	Local Importance (Higher Value)	**Yes**	

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Fish			
Fish	Local Importance (Higher Value)	No	Common and widespread fish species recorded in Lough Ree downstream of the Site. The Garrynafela Stream at the Site is highly unlikely to support fish species.
Invertebrates			
Marsh fritillary	Local Importance (Lower Value)	No	Neither Marsh Fritillary, nor its associated food plant; Devil's bit scabious was recorded during Site surveys.
White-clawed Crayfish	Local Importance (Lower Value)	No	There is no suitable habitat for white-clawed crayfish within the Site boundary or records for white-clawed crayfish within Lough Ree.

5.4 Characteristics of the Proposed Development

5.4.1 Construction Phase

The Construction Phase of the Proposed Development will involve Site preparation works, the establishment of construction services and the construction of the proposed units. Site preparation works will involve Site clearance, establishing entranceways and haul roads for vehicles, surveying and setting out, setting up the construction Site fencing and compounds etc.

5.4.2 Operational Phase

The Operational Phase of the Proposed Development will consist of the normal day-to-day operations necessary for the management of a residential development and the ongoing maintenance of the dwelling units, operational infrastructure and landscape features.

5.5 Potential Impact of the Proposed Development

As per the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009), likely effects have been assessed for KERs only, as listed in Table 5-10 above. All impacts are described in the *absence of mitigation*.

The following were identified as KERs:

Habitats

- WL1 – hedgerows and WL2 – treelines.
- WD1 – mixed broadleaved woodland.
- WS2 – immature woodland.
- GS4 – wet grassland.
- FW2 / FW4 – the Garrynafela Stream and on-site drainage ditch.

Species / species groups

- Small mammals (hedgehog, pygmy shrew & stoat).
- Badger.
- Otter.
- Red squirrel.
- Pine marten.
- Bat assemblages.
- Bird assemblages.
- Amphibians.
- Lizard.

5.5.1 Construction Phase

Potential Construction Phase impacts that could arise as a result of the Proposed Development include, but are not limited to, habitat loss or damage, habitat fragmentation, increased noise and dust emissions, increased light pollution, direct mortality or disturbance of fauna, runoff of sediment or other water borne pollutants into the Garrynafela Stream.

5.5.1.1 Habitats and flora

According to the Arboricultural Impact Assessment for the Site, a large quantity of the treelines on Site are proposed for retention and protection, the Proposed Development will require the removal of 38 trees out of a total of 111 existing trees on Site (Charles McCorkell, 2023). The majority of the trees identified for removal were evaluated as being in a 'poor' condition. All treelines within the Site being retained will be protected using robust fencing throughout the Construction Phase as per the Arboricultural Impact Assessment Report (Charles McCorkell, 2023). There is potential, in the absence of mitigation, for works accidentally being carried out within the root protection area of trees being retained and subsequent impacts on the trees via accidental damage, storage of materials in this habitat and 'spilling out' of materials into the root protection area, for example. As such, there is potential for *negative, short-term, moderate* impacts on the trees designated for retention within the Site of the Proposed Development.

The loss of KER habitats on Site is considered to be unavoidable due to spatial constraints it would not be possible to construct the Proposed Development without the loss of KER habitats. It is noted that the Proposed Development has been designed with the aim of removing habitats only where necessary.

The hedgerow, treelines, immature woodland and section of mixed broadleaved woodland identified for removal provide potential nesting, roosting, resting and foraging habitat for local bird and bat populations, as well as small mammals such as hedgehog and pygmy shrew. The loss of hedgerows and treelines will be offset to a degree by the provision of new, partly native, hedge and tree planting in the landscape plan for the Proposed Development. However, it will take several years before the newly planted hedges and trees provide the same level of support to local fauna as the existing habitats. It is noted that similar habitat is available in the surrounding landscape to the north and east of the Site. Therefore, the loss of these habitats represents a *negative, long-term, moderate* impact in the context of anticipated increased urbanisation and hedgerow removal associated with the Westmeath County Development Plan.

The wet grassland habitat at the Site will also be lost due to the proposed works. This habitat represents a small habitat area and its removal is not significant, the loss of this habitat represents a *negative, permanent, slight* impact at a local scale.

Sections of the Garrynafela Stream on Site will be culverted to facilitate the Proposed Development. As per EOB drawing no. 22-017-1101, approximately 0.2 river km of the Garrynafela Stream will be culverted to facilitate the Proposed Development, this constitutes a *negative, permanent, moderate* impact at a local scale.

5.5.1.2 Mammals (excl. bats)

The Site of the Proposed Development contains habitats suitable for small mammals such as hedgehog, pygmy shrew and stoat (hedgerow, scrub, grassland). Clearance of vegetation may put these species at risk of injury or death if present when clearance is taking place. These species are all highly mobile and would be able to move away from the area of works during vegetation clearance, however when rearing young (typically during spring and summer months) or hibernating (in the case of hedgehogs), these species will have reduced mobility. This risk constitutes a potential *negative, short-term, significant* impact on the local populations of these species.

Small mammals such as hedgehog have the potential to become trapped in excavations or 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 scale. Noise and dust generated during the Construction Phase has the potential to cause a disturbance impact on small mammals, in the absence of appropriate mitigation this represents a *negative, short-term, slight* impact.

Due to the absence of badger setts at the Site and the presence of suitable badger habitat north of the Site, any foraging habitat loss associated with the Proposed Development will have a *negative, permanent, slight* impact on badger should they be present. Although badger were not observed on Site, badger are known to utilise lands in the immediate vicinity of the Proposed Development. As badger are a mobile species and can establish a sett relatively quickly, should they establish within the Site boundary in the interim, the destruction of their sett would constitute a *negative, long-term, significant* impact at a local scale in the absence of suitable mitigation measures.

There is potential for the Proposed Development to result in indirect effects on otter within the Garrynafela Stream downstream of the Site and Lough Ree as a result of reduction of water quality. The reduction of water quality and consequent impact on fish species has the potential to affect otter by reducing prey availability. This constitutes a *negative, short-term, moderate* impact in the absence of suitable water quality mitigation.

The Site of the Proposed Development contains habitats (woodland and treelines) suitable for red squirrel and pine marten. Clearance of vegetation may put these species at risk of injury or death if present when clearance is taking place. This constitutes a potential *negative, short-term, significant* impact on the local populations of these species. The loss of treeline and woodland habitat on Site will also result in a reduction in potential suitable habitat for red squirrel and pine marten, should they utilise the Site. This represents a *negative, permanent, moderate* impact in the absence of suitable mitigation.

5.5.1.3 Bats

Bat activity on Site was generally concentrated along the treelines and hedgerows at the western Site boundary which were used by bat species as foraging and commuting habitat during bat surveys (Figure 5-13 and Figure 5-14). No bat roosts were identified on Site during surveys, two trees (T1894 and T1895) were noted as holding potential roosting features (mature ivy and rot holes) however no bat emergence or elevated bat activity was noted at the roost potential trees and bat were not considered to be utilising the trees at the time of the survey. In total, three bat species were recorded on Site soprano pipistrelle, common pipistrelle and Leisler's bat.

There is potential for a loss of foraging, commuting and roosting habitat for bats that reside within the vicinity of the Site through the loss of treelines, hedgerows, woodland habitats and grasslands. This loss and fragmentation of habitat, along with an increased noise and light levels associated with human activity could have a *negative, long-term moderate* impact on bat species.

Increased Construction Phase lighting at the Site could impact on bats using the Site during this period, if not maintained in a bat-friendly manner. This represents a *negative, short-term, moderate* impact at a local scale.

5.5.1.4 Birds

Several bird species were recorded utilising the habitats on Site. Should vegetation be cleared or cut back during the breeding bird season (March 1st to August 31st); there is the potential for nesting birds to be harmed and nests destroyed. This would be in contravention of the Wildlife Act 1976 (as amended) which provides protection to breeding bird species and their nests and young. In the absence of mitigation or preventative measures, this risk constitutes a *negative, short-term, significant* impact on local bird populations.

The Construction Phase will impact local birds through the loss of suitable foraging/nesting habitat in the form of areas of grassland, treelines, hedgerows, scrub and woodlands. This will be offset to a degree by the proposed landscape design for the Site. The habitat loss at the Site represents a *negative, long-term, moderate* impact to birds at the Site scale, as the habitats on Site become more anthropogenic and managed in nature.

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 in the absence of mitigation.

Barn owl was observed foraging at the Site of the Proposed Development during bat surveys in September 2022. The loss of suitable foraging habitat (grasslands) for this species represents a *negative, permanent, moderate* impact on local barn owl populations in the absence of suitable mitigation.

As the Site is not considered to provide suitable *ex-situ* habitat for any SCI species associated with the SPAs within the ZOI and none of the listed species were recorded utilising the Site during the winter waterbird surveys, the loss of habitat on-site will not impact these species. The occasional snipe was noted foraging on the Site lands during the winter waterbird surveys with black-headed gull and heron recorded flying over the Proposed Development Site. Although the Site is not considered to provide significant habitat for these species the loss of possible habitat on the wider waterbird assemblage has the potential to result in a *negative, permanent, slight* impact to waterbird species.

5.5.1.5 Amphibians

The Construction Phase will involve the removal of grassland and scrub habitats on Site. The loss of grassland and scrub on Site represents a *negative, permanent, moderate* impact at the Site scale in the absence of suitable mitigation should common frog and smooth newt be present during works. The removal of suitable habitat may put these amphibian species at risk of injury or death, as well as cause disturbance and/or displacement of these species from the Site and general area.

5.5.1.6 Reptiles

Common lizard has the potential to be impacted by the clearance of vegetation at the Site, possibly resulting in direct harm/mortality. This represents a *negative, short-term, significant* impact at the Site scale in the absence of suitable mitigation should lizard be present during vegetation clearance.

The construction works on Site will result in the loss of suitable foraging habitat for lizard, should they be present on Site. This represents a *negative, permanent, moderate* impact at a Site scale, in the absence of suitable mitigation.

5.5.2 Operational Phase

Potential Operational Phase impacts that could arise as a result of the Proposed Development include, but are not limited to, disturbance or displacement of species as a result of night-time light pollution and changes in habitat and land use and increased human presence at the Site, and damage or vandalism to the proposed landscaped areas and mitigation measures at the Site.

5.5.2.1 Habitats and flora

No further removal of habitats on Site will occur during the Operational Phase of the Proposed Development. Habitats on Site will be managed for ecological and amenity purposes.

5.5.2.1.1 Retained hedgerows

The Proposed Development will see the retained hedgerows and treelines at the Site being managed during its Operational Phase, to ensure safety and aesthetic value of these boundary habitats. It is possible, in the absence of an appropriate management plan, for these habitats to lose their biodiversity value through disturbance and poor management. This constitutes a *negative, long-term, moderate* impact at a local scale.

5.5.2.1.2 The Garrynafela Stream

Negative impacts to the Garrynafela Stream during the Operational Phase of the Proposed Development are not expected. All surface water during the Operational Phase of the Proposed Development will be attenuated on Site using several sustainable drainage measures and discharged at a controlled rate.

5.5.2.2 Mammals (excl. bats)

The Operational Phase of the Proposed Development has the potential to result in a disturbance impact to local mammals utilising the Site in general through night-time light pollution. This represents a *negative, permanent, moderate* impact in the absence of suitable mitigation.

5.5.2.3 Bats

The Operational Phase of the Proposed Development has the potential to result in a disturbance impact to local bat populations utilising the Site in general through night-time light pollution. This represents a *negative, permanent, moderate* impact in the absence of suitable mitigation.

5.5.2.4 Birds

No significant effects on bird species are anticipated during the Operational Phase of the Proposed Development.

5.5.2.5 Amphibians

No significant effects on amphibians are anticipated during the Operational Phase of the Proposed Development.

5.5.2.6 Reptiles

No significant effects on reptiles are anticipated during the Operational Phase of the Proposed Development.

5.5.3 Potential Cumulative Impacts

If the Proposed Development and the 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 birds and small mammals due to the combined loss of nesting or foraging habitat in the locality of the Site, and potential impacts on bats and mammals due to the combined loss of suitable foraging and commuting habitat in the locality. The below listed planning applications were all accompanied by the relevant environmental assessments that detail the potential impacts and the mitigation measures required to ensure the developments do not have a significant effect on local biodiversity, alone or in-combination with other developments. Once the mitigation measures for each of the below projects and this planning application are adhered to, the potential for likely significant cumulative impacts can be ruled out.

5.5.3.1 Existing granted planning permissions

A search of planning applications located within 2km of the Proposed Development was conducted using online planning resources including the National Planning Applications Database (NPAD) (MyPlan.ie) and Westmeath County Council's online planning database. Any planning application listed as granted, application registered or application pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on local biodiversity. Long-term developments granted outside this time period were also considered where applicable. The larger-scale developments identified within the vicinity of the Site of the Proposed Development are identified below in Table 5-11.

Table 5-11. Nearby permitted or pending planning applications.

Planning Reference	Location Relative to Proposed Development	Development Description
2360047 – Marina Quarter Limited.	West of the Proposed Development.	The development will consist of modifications to the permitted application WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 and concurrent application WMCC Reg. Ref. 22/577 to include the following: Removal of the permitted creche c.260sqm and associated parking granted under WMCC Reg Ref. 14/7103/ ABP Ref. PL25.244826. The recently permitted creche granted under WMCC Ref. 22/340 will regularise childcare provision on site. The remaining area will form part of the public open space associated with the wider development at Cornamaddy (c.710sqm). Associated minor landscape revisions to the concurrent application WMCC Reg. Ref. 22/577; Provision of 6 no. additional houses comprising 4 no. Type A1 4-5 bed 2-3 storey semi-detached units (c.166sqm area each) and 2 no. Type B 3 bed 2 storey semi-detached units (c.113sqm area each). All with associated rear gardens and 2 no. parking spaces per unit. No new house types are proposed under this application; Relocation and minor alterations including changes to the floor levels, house plots and associated gardens and boundary treatments of the remaining units comprising 4 no. Type A1 4-5 bed 2-3 storey semi-detached units (c.166sqm area each), 2 no. Type B 3 bed 2 storey semi-detached units (c.113sqm area each), 1 no. Type D 5 bed 2-3 storey detached unit (c. 215sqm

Planning Reference	Location Relative to Proposed Development	Development Description
		area) and 2 no. Type E1 3 bed 2 storey semi-detached units (c.112 sqm area each) permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826. No changes to the permitted floor area of these units; Minor modifications to the concurrent application WMCC Reg. Ref. 22/577 to include reconfiguration and relocation of the main access roads south of the planned distributor road. Readjustment of the internal shared access road parallel to the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826; All associated site development works, services provision, connection to water services and connection to the section of the distributor road proposed under WMCC Reg. Ref. 22/577, public open space (c.600sqm), landscaping, boundary treatment works and car parking provision
22577 – Marina Quarter Limited.	West of the Proposed Development	The development will comprise of a residential development and public open space comprising the following: Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a sections of the distributor road permitted under WMCC Reg. Refs 14/7103 ABP Ref. PL25.244826 and 22/253 to the east of the site. All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated esb substation cabinets, bin stores, car and bicycle parking provision. This development will form part of a larger/future phase of the development. This planning application is accompanied by an EIAR and NIS
22253 – Marina Quarter Limited.	Within redline boundary.	Planning permission was sought the following: 1) Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces. 2) All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the southeast of the site. 3) All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. esb substation cabinets, bin stores, car and bicycle parking provision. 4) Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826. This development will form part of a larger/future phase of the development; No changes to the existing pumping station located outside the northern site boundary; A NIS was submitted with this application.
22340 – Marina Quarter Limited	West of the Proposed Development.	Planning permission was sought for the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area (c. 595 sqm), 18 no. car

Planning Reference	Location Relative to Proposed Development	Development Description
		parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. A NIS was submitted with this application.
177244 - Parana Properties Ltd.	West of the Proposed Development.	Planning permission was sought for the development of 7 no. new dwellings to include 3 no 5 bedroom detached houses and 2 no 4 bedroom detached houses with optional fifth bedroom/study and 2 no. 4 bedroom semi-detached houses with open fifth bedroom/study and all associated site development works including road networks, services, landscaping, and boundary treatments. A ten-year permission is being sought. Decision date: 07/09/2018, planning permission granted with conditions
147103 - Parana Properties Ltd.	West of the Proposed Development.	Planning permission was sought for the construction of 125 no. new dwellings to include 59 np. 4/5-bedroom houses, 46 no. 3 bedroom houses, 20 no. 2 bedroom houses and a creche. The development to include the provision of all associated site development works including road networks, services, landscaping, and boundary treatments. A ten-year permission is being sought. Decision date: 02/04/2015, planning permission granted within conditions.

5.5.4 "Do Nothing" Impact

Should the Proposed Development not go ahead, the habitats at the Site would continue to evolve and the lands would continue to be used by local farmers. The treelines, hedgerow and Garrynafela Stream would continue to serve as ecological corridors for local wildlife, providing habitat connectivity, as well as nesting, commuting and foraging habitat for local fauna. The grassland and hedgerow habitats would continue to offer resources to local pollinators.

5.6 Avoidance, Remedial & Mitigation Measures

5.6.1 Construction Phase

5.6.1.1 Mitigation 1: Engagement of an Ecological Clerk of Works

Several KERs were identified at the Proposed Development Site which will require further surveys prior to the commencement of and during the Construction Phase of the Proposed Development. The contractor will employ a suitably qualified Ecological Clerk of Works (ECoW) to oversee the implementation of the mitigation measures outlined below. The ECoW will be required to provide reports and written correspondence as requested in order to demonstrate compliance with the measures outlined in this report.

5.6.1.2 Mitigation 2: Construction Phase surface water management

The Proposed Development includes a detailed drainage plan that is assessed in full in Chapter 7 – Hydrology of this EIAR. This drainage plan and all associated measures have been taken into account in this Biodiversity Chapter but are not included in full (to avoid repetition). The drainage design for the Proposed Development aims to minimise surface water runoff arising on Site, to adequately control and manage surface water runoff from the Site containing suspended solids and to ensure that the hydrological function of the

Garrynafela Stream and downstream waterbodies are not affected by the Proposed Development.

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 Environmental Section of Westmeath County Council.

Personnel working on Site will be trained in the implementation of environmental control and emergency procedures. Procedures and 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.
- 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.

A number of pollution-prevention measures for the Construction Phase of the Proposed Development are described in the outline Construction Environmental Management Plan (CEMP) accompanying this application under a separate cover. All measures outlined in the CEMP are established measures that are widely used in construction projects, and there is a high degree of confidence in their success. The contractor will be required to employ an Environmental Manager and ECoW to assist with preparing a detailed CEMP and its implementation, and to advise on all works in close proximity to the Garrynafela Stream.

The following pollution prevention measures are included in the CEMP and summarised below:

- All works within and adjacent to the Garrynafela Stream will be planned in accordance with the contractor's ECoW and a method statement. The ECoW or Site Environmental Manager will give a toolbox talk in advance of works, and all working areas will be marked out clearly in advance of works.
- Silt-management measures will be implemented for all groundworks in order to prevent the release of any suspended solids into the Garrynafela Stream. This will include the use of straw bales/silt fences along the entire length of the Garrynafela Stream along the western Site boundary.
- Prior to the commencement of earthworks, silt fences/straw bales will be installed by suitably qualified Site personnel 10m back from the Garrynafela Stream. These measures will act as a temporary sediment control device to protect the Garrynafela Stream and downstream Lough Ree.

- The silt fencing/straw bales will be inspected daily based on Site and weather conditions for any signs of contamination or excessive silt deposits and records of these checks will be maintained.
- The main compound on Site will include a bunded area for the storage of pollutants, with additional areas for stockpiling of materials.
- There will be no cement washout on Site except for washout of chutes, the washings of which will be collected into an appropriate container for compliant off-Site management.
- Where cast-in-place concrete is required, all work will be carried out in the dry and effectively isolated from the Garrynafela Stream. Pre-cast elements will be used where possible. No batching of wet-concrete products will occur on Site.
- All plant machinery required on Site will be serviced before being mobilised to Site.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling stations located on Site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on Site. Refuelling stations will be located at a distance greater than 50m from the Garrynafela Stream or on-site drainage infrastructure. The plant refuelling procedures will be detailed in the contractor's method statement.
- Spill kits will be made available in each item of plant required on Site.
- A regular review of the weather forecast for extremely 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.
- As per the CEMP, where there is a requirement to collect and treat surface water within the Site during the Construction Phase, run-off from the working Site or any areas of exposed soil will be channelled and intercepted at regular intervals via perimeter swales. The swales will be installed at low points around the construction areas. If required, water will be pumped from the swales into sediment bags with overflows directed to land rather than a watercourse or surface water sewer.
- Discharge to land will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge from the silt bag will be enclosed by a perimeter of double silt fencing.
- No pumped construction water will be discharged directly to any drainage ditch or watercourse.
- The developer will ensure that erosion control i.e., silt-fencing, straw bales, silt bags and swales are regularly maintained for the duration of 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 as much as possible. Where this is not possible, designated temporary material storage areas will be used.
- These temporary storage areas will be located at least 10m from the Garrynafela Stream and will be surrounded by silt-fencing to filter any suspended solids from surface waters arising from these materials.
- 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.

- All personnel working on Site will be trained in pollution incident control response.
- 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, BPGCD005).
- All associated waste from portaloos and/or containerised toilets and welfare units will be removed from the Site by a licenced waste disposal contractor.

5.6.1.2.1 Culvert placement

EOB drawing no. 22-017-1101 indicates that approximately 0.2 river km of the Garrynafela Stream will be culverted to facilitate the Proposed Development. All works adjacent to the Garrynafela Stream will be carried out in accordance with IFI *Guidance on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016) and the National Roads Authority (now TII) *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*.

The following mitigation measures will protect the Garrynafela Stream during culvert placement:

- A suitably qualified ECoW will be present on-Site during culvert placement.
- The Garrynafela Stream will be culverted at the outset of construction works, prior to the stripping of the topsoil on Site.
- The Garrynafela Stream will be culverted during low flow / dry conditions, and this will be undertaken in sections. The upstream end of the Garrynafela Stream will be dammed and any water will over over-pumped via a silt bag to the downstream end of the waterbody.
- Where in-stream bed material is to be removed, coarse aggregates, if present, should be stockpiled for replacement in the reformed channel.
- Entry to the channel of the Garrynafela Stream by vehicles and/or personnel will not be permitted unless absolutely necessary.
- Where required, instream works will only be carried out during the period July – September.
- Instream machine works will 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.
- If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from the Garrynafela Stream.
- Works involving the breaking of stream banks e.g., any reprofiling of the stream channel, will be carried out with suitable and effective mitigation in place to minimise/prevent sediment release to the stream i.e., silt-traps and other suitable in-stream measures for the collection/filtration of sediment e.g., straw bales.

5.6.1.3 Mitigation 3: Protection of habitats

Trees that are proposed to be retained on Site (as per the tree protection plan accompanying this application drawing no. 220530-P-12) will be protected for the duration of the Construction works by protective fencing, signage and/or ground protection prior to any materials or machinery being brought on Site and prior to any development or soil stripping taking place. Areas that are designated for new planting will similarly be protected. Barriers will be fit for the

purpose of excluding construction activity. In most cases barriers will consist of a scaffold framework comprising a vertical and horizontal framework, well braced to resist impacts. To ensure the protective barriers are respected, clear concise signage will be affixed to the barrier in an unrestricted easily viewer location. The protective barriers will remain in place in an undisturbed condition and only removed on completion of all construction activity. Any breach of the protective fencing will be reported to the consulting arborist.

During the course of the Construction Phase the integrity of the protective fencing must be respected and remain in place at all times. No building materials or soil heaps will be stored within this area. Should essential works need to take place within the root protection area, the project arborist must be informed in advance and any necessary mitigation measures will be put in place. The protective fencing will remain in situ for the duration of the project and will only be removed upon completion of all works. Construction will only commence once the protective barriers and/or ground protection have been erected.

Further information on Tree Protection measures can be found in the Arboricultural Impact Assessment accompanying this application (Charles McCorkell, 2023).

5.6.1.3.1 Invasive species

No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site during surveys. As such, no significant risk of impacts relating to the spread of invasive plant species exists at the Site. Nevertheless, efforts should be made to remove such plants and minimise any risk of spread off-Site. The respective distributions of the non-native species recorded on Site (sycamore and Norway maple) are not significant and their removal will not be an issue.

Transport Infrastructure Ireland (2020) guidance 'The Management of Invasive Alien Plant Species on National Roads – Technical Guidance' will be consulted with regards the treatment, removal and disposal of invasive flora at the Site.

The following measures will be adhered to, to avoid the introduction or dissemination of invasive species to and from the Site of the Proposed Development:

- Validation that all machinery / vehicles are free of Invasive Alien Plant Species (IAPS) prior to their first introduction to Site.
- Certification from the suppliers that all imported soils and other fill/landscaping materials are free of IAPS.
- A regular schedule of Site inspections across the IAPS growing season, for the duration of the construction works.
- Validation that all machinery / vehicles are free of IAPS, prior to leaving the Site.
- Appropriate and effective Site biosecurity hygiene.

5.6.1.4 Mitigation 4: Protection of terrestrial fauna

5.6.1.4.1 Small mammals

As best-practice, all construction related waste on Site e.g., plastic sheeting, netting etc. will be kept in designated areas on Site and kept off ground level to protect hedgehogs from entrapment and possible death. These measures will also act to mitigate potential negative impacts on any other small mammal species potentially utilising the Site.

5.6.1.4.2 Log piles

Piles of logs and other woody vegetation arising from the vegetation clearance on Site will be left in suitable secluded margins of the Site; to provide habitat for common frog, lizards and small mammals such as hedgehog and pygmy shrew for the duration of the Construction Phase and operational lifetime of the Proposed Development where possible. These areas of woody debris will also benefit local invertebrate species through the provision of shelter and food sources.

5.6.1.4.3 Pre-construction mammal surveys

In accordance with the NRA Guidance, pre-construction mammal surveys will be undertaken at the Site to identify evidence of protected mammals (e.g., badger, pine marten, red squirrel) within the works area associated with the Proposed Development. The survey will be undertaken to ensure that such protected species have not taken up residence within or close to the development footprint. Should breeding or resting places be recorded in the pre-construction surveys, a site-specific mitigation plan shall be prepared and agreed with the NPWS prior to the commencement of works. It is not anticipated that any protected mammal breeding/resting places will be encountered or required to be excluded due to the Proposed Development based on the findings of the surveys previously undertaken at the Site. Pre-construction mammal surveys will be undertaken 8-12 weeks prior to the commencement of vegetation removal on Site.

Although not directly recorded during surveys, the Site was identified as holding potentially suitable habitat for red squirrel and pine marten (woodland and treelines). The clearing of trees on Site will take place outside of the breeding season for these mammals (clearance to take place between late September and November). An ECoW will be present on-site during felling, the ECoW will undertake pre-felling assessments of each tree to search for dreys or individuals within the canopy immediately prior to tree felling works. If dreys or individuals are identified works will stop until the dreys are confirmed to be inactive or the individuals have moved out of the danger zone of felling works. Felling will occur in a consistent direction moving to prevent entrapment and to encourage red squirrel and other mammals in the direction of the trees identified for retention. The landscape plan for the Proposed Development includes abundant additional tree planting on Site, the proposed planting connects to the retained treelines as much as possible based on Site constraints.

5.6.1.4.4 Lizard and Amphibians

To ensure no adverse effect of any herptiles which may be present on the wider Site, a phased approach to clearance, under the supervision of an ECoW, will be used to allow wildlife to move from any suitable habitat that will be removed. This will take place during weather that is suitable for reptiles and amphibians to be active (above 10°C with little rain), during the main activity season (generally March to September inclusive):

- Phase 1 – Cutting vegetation to 150-200 mm and removing the arisings;
- Phase 2 – Hand-searching the cut areas (conducted by an ecologist) and removing any sheltering habitat (e.g. logs or debris) then cutting vegetation to ground level and removing the arisings; and
- Phase 3 – Soil scrape.

Should any suitable refugia (such as log piles) need to be removed, this will be undertaken outside the reptile gravid period (May to July) and will be supervised by the ecologist.

Once an area of the Site has been cleared of scrub and vegetation to allow works, it will be maintained this way to ensure no suitable habitat for lizard develops i.e., no new piles of rubble/logs etc will be created within the active construction site; these can be deposited along the outer margins of the Site as new habitat. Furthermore, construction staff will be briefed on herptiles and remain vigilant for the presence of lizards and amphibians throughout the Construction Phase. Should any hibernating herptiles be discovered, the works in that area will cease, the ecologist will be contacted immediately and will move the lizard carefully to the Site's outer boundaries. The works can then continue in that area once the ecologist confirms no lizards are at risk.

5.6.1.4.5 Vegetation clearance

Any clearance of vegetation will be carried out outside the main bird breeding season, i.e., outside the period of 1st March to 31st August, in compliance with the Wildlife Act 1976 (as amended). Should any vegetation removal be required during this period, this vegetation will be checked for bird or nests by a qualified Ecologist. If encountered, the precise location within the hedgerow/trees and the species of bird present will be recorded. If works require the removal of an active nest, the area will be protected and the NPWS will be consulted prior to any works commencing in this area. The Site manager will be informed of the presence of nesting birds and advised that no works can commence in this area until further notice. Appropriate protection measures will be implemented in consultation with the project ecologist.

Table 5-12 provides guidance for when vegetation clearance is permissible. Information sources include the Herpetological Society of Ireland, British Hedgehog Preservation Society's *Hedgehogs and Development and the Wildlife (Amendment) Act*, 2000.

The preferred period for vegetation clearance is within the months of late **September and October**. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., hedgehog, pygmy shrew). Where this seasonal restriction cannot be observed, a check for active roosts and nests will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist/ ornithologist and repeated as required to ensure compliance with legislative requirements.

Table 5-12: Seasonal restrictions on vegetation removal. Red boxes indicate periods when clearance/works are not permissible.

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Amphibians	Vegetation/ habitat clearance permissible (July – Feb).		Amphibian breeding season (estimated). No ditch destruction unless confirmed to be devoid of tadpoles and other signs of amphibians (March – June).				Vegetation/ habitat clearance permissible (July – Feb.					
Common Lizard	Lizard Hibernation Season. No habitat clearance permissible (Nov - Feb).		Active period. Habitat (scrub, grassland) clearance permissible (Early March – October)								Lizard Hibernation Season. No habitat clearance permissible (Nov – Feb).	
Breeding Birds	Vegetation clearance permissible (Sept – Feb)		Nesting bird season. No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist (Mar – Aug).						Vegetation clearance permissible (Sep – Feb).			
Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov - Aug).								Preferred period for tree-felling (Sep – Oct).		Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov – Aug)	
Hibernating mammals (e.g., Hedgehog, Pygmy Shrew)	Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist (Nov - Mar).			Vegetation clearance permissible (April – Oct).							Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist (Nov – Mar).	
Red squirrel and pine marten	Tree felling to be avoided unless confirmed to be devoid of red squirrel and pine marten by an ecologist (December – early September)										Preferred period for tree felling (late September – November).	Tree felling to be avoided

5.6.1.5 Mitigation 4: Protection of bats

5.6.1.5.1 Bat Friendly Tree Felling

No bat roosts were confirmed on Site however two trees (T1894 and T1895) were considered to hold 'moderate' roost potential for bats. These trees will require two pre-felling emergence surveys to be conducted within the period of May – September by a bat ecologist as per the BCT Guidelines (Collins, 2016). The results these surveys will inform further recommendations e.g., where a roost is identified, further surveys and a derogation licence will be required, and no felling will take place until this licence is obtained. Where emergence surveys have shown that bats are not present, bat roost features will be blocked before later felling.
Felling of trees with roost potential but confirmed devoid of bats will be by 'soft-felling', where the tree in question is section felled by a tree surgeon under the supervision of a bat ecologist if the bat ecologist recommends it. If the bat specialist is content that section felling is not required, then trees will be felled as follows (as per NRA (Now TII) 2005 Guidelines):

- Tree-felling will be undertaken in the months of September and October. This is the transitional period between when young bats are starting to fly from maternity roosts and the hibernation season and are less vulnerable. This approach will also avoid the nesting bird season.
- Felling during the winter months will be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as bat body temperature is too low and they may have to consume too much body fat to survive.
- Tree-felling will be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. To ensure the optimum warning for any roosting bats that may still be present, an affected tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then be pushed to the ground slowly and will remain in place for a period of at least 24 hours, and preferably 48 hours to allow bats to escape.
- When felling trees with a chainsaw, it is important to ensure that the rate of fall is not accelerated by the use of a chain and vehicle (e.g., tractor). It is unlikely that a bat would survive such a heavy impact.
- A derogation licence from the NPWS may be required for felling if during tree removal works bats are found to be roosting in any affected trees. A derogation licence will also be required if works are required to the confirmed roost on Site, or if the roost will be disturbed through construction and operational impacts.

A pre-commencement check will be required for any other trees on Site noted to have a change in tree structure between the initial Site surveys and the commencement of works on Site. This will ensure no new potential roost features have formed. The pre-commencement check is required as the roost potential of trees on Site may change between the time of writing this report and the commencement of works; through storm damage etc. Should bats be found, felling will be postponed until a derogation licence is obtained by the bat ecologist from the NPWS. This will avoid any harm to bats and the committing of an offence under the Wildlife Act 1976 as amended.

5.6.1.5.2 Site Lighting

Site lighting may be required during the Construction Phase, to protect bats and other nocturnal fauna from excess night-time lighting, the following luminaire specifications, taken from the latest guidance (ILP, 2018) will be adhered to during the Construction Phase:

- Retained trees will not incur an increase in the current lux level due to Construction Phase lighting.
- All luminaires 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 will be used to reduce the blue light component of the LED spectrum).
- Column heights will be carefully considered to minimise light spill, the shortest column height allowed will be used where possible.
- Only luminaires with an upward light ration 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 (1minute) timers.

5.6.1.6 Mitigation 5: Protection of semi-aquatic and aquatic fauna

5.6.1.6.1 Removal of wet grassland and scrub habitat

The Site provides potential habitat for common frog and smooth newt in the form of the wet grassland and scrub. Prior to the commencement of works on Site, the Site ECoW will conduct surveys for breeding frog and newts. The Site will be surveyed during the optimal time of year for signs of breeding activity (amphibian adults, spawn and juveniles). Survey methodology will take consideration of the National Roads Authority (NRA, 2009), now Transport Infrastructure Ireland (TII) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes, The Irish Wildlife Trust National Smooth Newt Survey 2013 Report (Meehan, 2013) and the National Frog Survey of Ireland 2010/11 (Reid et al. 2013). Should frog or newt or their young require removal to allow works to proceed, the NPWS will be consulted by the project ecologist prior to any such works commencing and a method statement may be provided on how to proceed with works.

5.6.1.6.2 Otter

Although included as a precautionary KER, otter are unlikely to be significantly affected by the Proposed Development. Otter are a QI for Lough Ree SAC, downstream of the Site along the Garrynafela Stream. The surface water protection measures outlined in 5.6.1.1 will serve to protect water quality in the Garrynafela Stream, which will in turn limit and/or eliminate any potential negative impacts on prey availability for otter downstream of the Site.

5.6.1.7 Mitigation 6: Reduction of noise and dust related impacts

5.6.1.7.1 Reduction of noise related 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. The following best practise measures will be put in place to ensure the minimisation of potential impacts on fauna as a result of the Proposed Development. Limiting the hours during which Site activities likely to create high levels of noise are permitted.

- Establishing channels of communication between the contractor/developer, local authority and residents.
- Appointing a Site representative responsible for matters relating to noise.
- 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.
- 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.

5.6.1.7.2 Reduction of dust related impacts

The following general dust control measures will be followed for the duration of the Construction Phase and will ensure no significant dust related impacts occur on nearby sensitive receptors including local faunal species:

- 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.
- 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 will be used at Site exit points to remove caked-on dirt from tyre tracks.
- Equipment will be washed at the end of each workday.
- If practical, wheel-washing facilities will 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 will 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 will wastewater from equipment, wheel or surface cleaning enter the Garrynafela Stream.

5.6.2 Operational Phase

5.6.2.1 Protection and enhancement of habitats

The landscaped sections of the Proposed Development will be managed in a way so as to mitigate the loss of the existing hedgerows and treelines as much as is possible. In this way new hedgerows and treelines will be maximised in the ecological value they provide at the Site, with habitat connectivity ensured along the margins of the Proposed Development, connecting it in with the wider field boundary network in the area. This connectivity is vital for wildlife such as birds, bats, mammals, and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and treelines in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area.

This low intervention approach may not be suitable for the more landscaped areas of the Site, which may need to be maintained to a higher degree for health and safety or aesthetic reasons. However, a high quantity of native species is included in the landscape design in these locations to maximise the biodiversity value of these internal landscaped parts of the Site.

For the hedgerows running along the outer margins of the Site, the following management approach is proposed to maximise their biodiversity value and offset the loss of existing hedgerows at the Site:

- Hedgerows will be maintained with a natural meadow strip of 1-2m at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A two-cut management approach is ideal for suppressing coarse grasses and encouraging wildflowers. Cut the hedgerow basal strip once during February and March (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge once again during September and October (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).
- N.B. Raising the cutter bar on the back cut will lower the risk to amphibians, reptiles and small mammals.

- Hedgerows, where possible, should be allowed to reach at least 2.5m in height, and should be trimmed in an A-shape; maintaining a wider base to compliment the natural meadow strip at their base.
- Where hedgerow trimming needs to occur delay trimming as late as possible – until January and February as the surviving berry crop will provide valuable food for wildlife. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow cutting should be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) needs to be taken.
- Where possible, cut these outer boundary hedgerows on a minimum 3-year cycle (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (blackthorn in March, hawthorn in May).
- Where they occur naturally, bramble and ivy should be allowed grow in hedgerows, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

- Hedgerows will not be over-managed. Tightly cut hedges mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.
- Hedgerows will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds.
- Do not use pesticide/ herbicide sprays or fertilisers near hedgerows, scrub or areas of wildflower meadows as they can have an extremely negative effect on the variety of plants and animals that live there.

5.6.2.2 Landscape design

The landscape design for the Site includes a planting palette which has been specifically chosen for its pollinator friendly species as well as the overall aesthetic value of the trees, shrubs and perennials. Pollinator friendly species incorporated into the landscape design include English lavender (*Lavandula angustifolia*), dogwood (*Cornus alba*), skimmia (*Skimmia japonica*), orange glow (*Pyracantha* spp.), spotted dead nettle (*Lamium maculatum*) and sweet William (*Dianthus barbatus*). An area of traditional Irish wildflower meadow planting is included along the western Site boundary (Figure 5-16). All wildflower seeds will be Irish Provenance Certified Seed, from a reputable source such as Design by Nature (Wildflowers.ie). To maximise the biodiversity value of the landscaping at the Site, consideration has been made to the All-Ireland Pollinator Plan planting code (NBDC, 2015).

The landscape plan also includes the use of semi-mature tree planting with a high quantity of native species including oak, downy birch (*Betula pubescens*), hawthorn, blackthorn and holly (*Ilex aquifolium).* Native planting is proposed along the western Site boundary to reinforce the existing treelines and hedgerows. Although the Proposed Development will result in a loss of 38 trees on Site, the landscape design for the Site includes the planting of 420 new trees, which will be planted throughout the Site. Overall, the landscape design will have a *positive, permanent, moderate* impact at a local scale.

Figure 5-16. Landscape design for the Proposed Development (Park Hood, Drg. No. 7583-L-2000)

5.6.2.3 Wildlife friendly lighting

To minimise disturbance to bats in the immediate vicinity of the Site, the lighting and layout of the Proposed Development has been designed to minimise light spill. This will be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust ‘Artificial Lighting and Wildlife Interim Guidance’ and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'.

Bat-friendly lighting measures have been incorporated into the Proposed Development design and associated lighting plan. Dark buffer zones can be effectively used to separate important habitats or features from lighting by forming a dark perimeter around them (ILP, 2018). Buffer zones rely on ensuring light levels within a certain distance of features do not exceed certain defined limits, generally 1 lux or less. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature. Examples of this application can be seen in Figure 5-17.

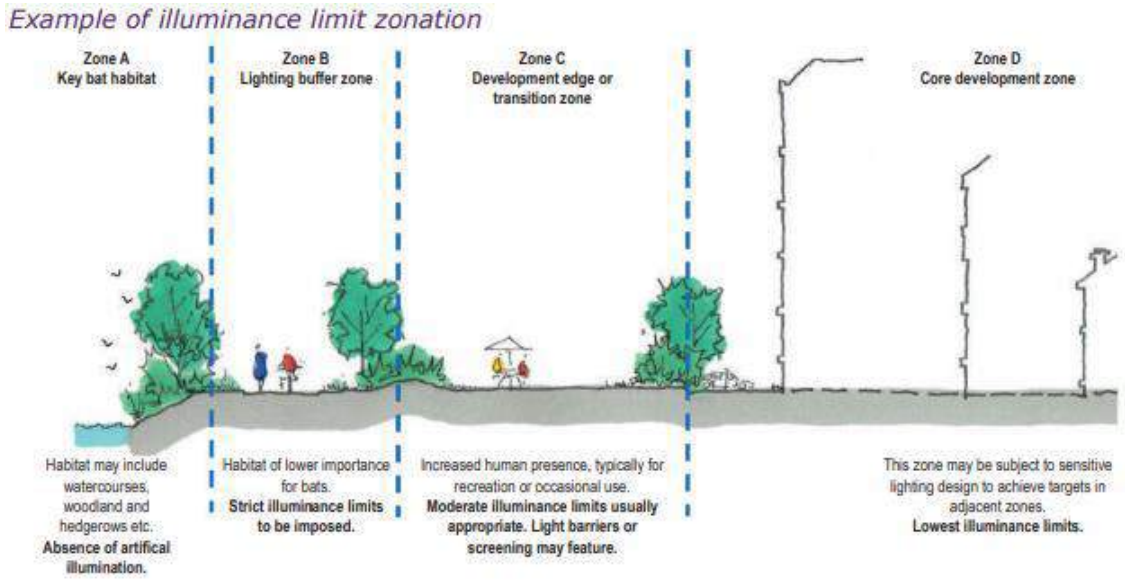

Figure 5-17: External lighting zonation diagram adapted from ILP (2018).

Night-time lighting across the Site will be kept to a minimum (once satisfying health and safety requirements), through the reduction of light spill from the buildings via windows/entrances, and the reduction of spill/glare from outdoor lighting in place on the building exterior and through the Proposed Development grounds.

Incorporation of appropriate luminaire specifications will have a considerable input in mitigating the potential impact of night-time lighting on local bats. Based on the above guidance documents, the lighting scheme for the Proposed Development, as confirmed by the lighting design team (VeeLite), has incorporated the following measures:

- Luminaires will have zero upward light ratio, to minimise light pollution, energy waste and impact on wildlife.
- Lighting will be directional on to the roadways and footways only with minimal spillage of light onto adjoining habitats.

- LED luminaries are utilised where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- Narrow spectrum bulbs will be used to lower the range of species affected by lighting. Light sources that emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum will be utilised to avoid attracting lots of insects. Lighting regimes that attract lots of insects result in a reduction of insects in other areas like parks and gardens that bats may utilise for foraging.
- Maintain dark zones of 10m in width for foraging bats in areas where lighting is not necessary e.g., along the vegetated boundaries of the Site. However, where lighting is required, this lighting will be placed at a minimum height using the lowest lux value permitted for public health and safety.
- Motion sensor and timer activated lighting will be in place at the Site to ensure minimal light spill occurs during the hours of darkness.
- The colour rendering of the selected light fittings will be 2700k making the LED fittings a warmer light, helping to further minimize the impact on the local wildlife.
- Retained treelines along the Site boundaries will, as much as possible while satisfying health and safety requirements, not incur an increase in current lux levels due to the Proposed Development.
- Planting will provide areas of darkness suitable for bats to feed and commute.
- Reflective surfaces will not be placed under lights.

5.6.2.4 Bird box scheme

Bird boxes will be installed as part of the landscape plane, the placement of the bird boxes will be overseen by the appointed ECoW. The boxes will be durable and will be firm and secure to their supports, and only placed on trees that are robust and large enough to support bird boxes.

There are various standard bird box options and at least two of each of the following box types will be installed.

- ‘Hole type’ bird box (28 mm hole) – for example the Eco Small Bird Box, which can be found at the following link - https://www.nhbs.com/eco-small-bird-box
- Open fronted bird boxes for blackbirds – for example the Blackbird FSC Nest Box, which can be found at the following link - https://www.nhbs.com/blackbird-fsc-nest-box
- Open fronted bird boxes for wrens and robins – for example the Eco Robin (Open-Fronted) Nest Box, which can be found at the following link - https://www.nhbs.com/eco-robin-open-fronted-nest-box

Hole type bird boxes should be positioned 2-4m off the ground, with good-visibility, a clear flight line and away from the prevailing wind direction.

The open fronted boxes for robin, wren and blackbirds should be installed lower than 2m but amongst dense vegetation (e.g., hedges or areas of scrub that develop within the Site), or newly planted vegetation that will grow to become dense upon establishment and somewhere cats and other predators won’t easily see or access them.

Unless the areas are very sheltered, bird boxes should be fixed facing between north and south-east to avoid the hot sun and the wettest winds. Bird box placement will be directed by the ECoW and amended as appropriate.

5.6.2.5 Bat roosting opportunities

To offset the loss of trees on Site, 10 bat boxes will be erected on suitably large trees along the boundaries of the Site to provide future roosting opportunities. The guidance of a suitably qualified Bat ecologist will be sought in the selection of bat box type and placement; to avoid disturbance from lighting generated by the Proposed Development and maximise the likelihood of their uptake by local bats. Bat boxes will be placed over 4m high (if possible) onto retained mature trees, the trees in which they are placed will not be illuminated.

5.6.2.6 Hedgehog highways

By creating a number of separate private dwellings and associated gardens at the Site, large areas of the Site ultimately become fragmented and potentially inaccessible to species such as hedgehogs, which like to roam each night in search of food (garden pests e.g., slugs). This can be mitigated by ensuring that the boundaries and barriers within and surrounding the Site i.e., garden fencing, railings and gates are permeable for hedgehogs (Figure 5-18). This can be done by:

- The use of fence panels with 13 x 13 cm holes at ground level (hedgehog holes).
- Leaving a sufficient gap beneath gates.
- Leaving brick spaces at the base of brick walls.

A variety of fence suppliers' stock specific hedgehog-friendly fencing options, which can be easily incorporated at little to no additional costs. These simple measures will provide habitat connectivity at the Site for small mammals and reduce the impact of the land-use change on these species. Including details of hedgehog-friendly features in the new homeowner's welcome pack will raise awareness and prevent homeowners from reversing these features, for instance blocking fence holes.

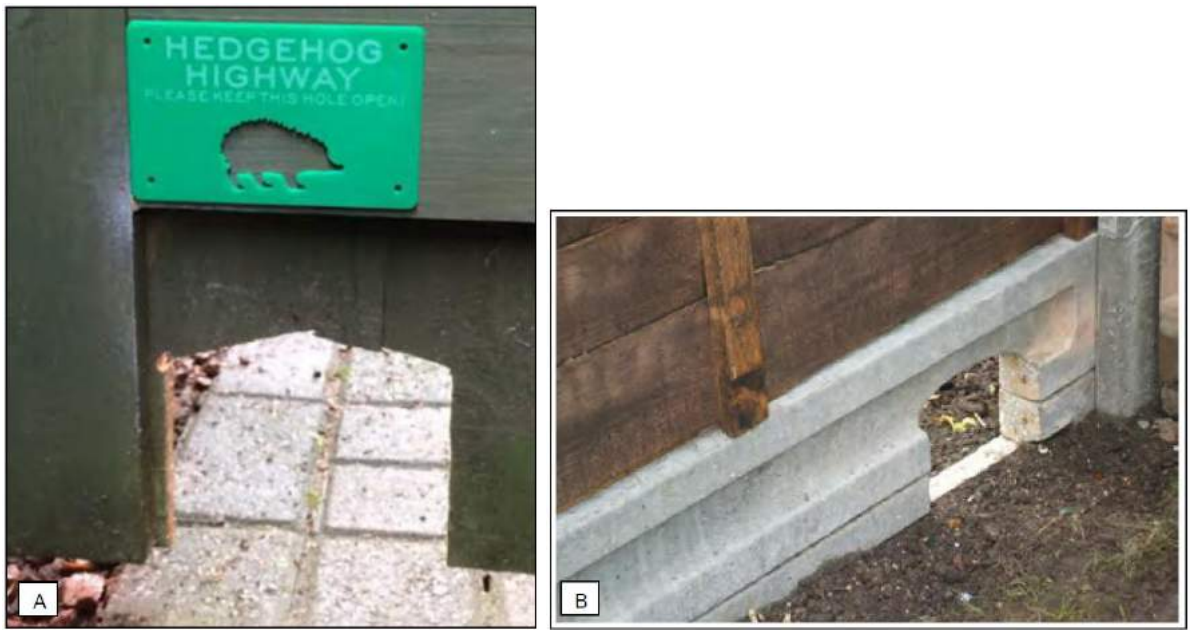

Figure 5-18: Example of 'hedgehog highways' that can maintain habitat connectivity for hedgehogs in residential developments (Images: BHPS Guidance document).

5.6.3 "Worst Case" Scenario

In the 'worst case' scenario at the Site of the Proposed Development, where the recommendations and mitigation measures described in this report were to be disregarded or should fail; vegetation would be cleared during the nesting bird season or small mammal/lizard hibernation season causing the destruction of nests, eggs and some birds and small mammals during the clearance works. Another 'worst case' scenario could see the accidental release of untreated wastewater with potential impact on the receiving water environment or accidental fuel release from the on-Site plant and release to the Garrynafela Stream. Sediment and pollutants could potentially cause negative effects downstream in the Lough Ree, impacting on ecological sensitivities.

This scenario would only occur in the event of the failure of the surface water management and treatment measures that are included in the proposed project design, or the failure of the set of proposed mitigatory measures recommended in this Chapter.

5.7 Residual Impacts

Residual impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures*'. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment. Table 5-13 provides a summary of the impact assessment for the identified KERs and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

All mitigation measures detailed in this Chapter will be implemented in full and will remain effective throughout the lifetime of the facility. Therefore, no significant negative residual impacts on the local ecology or on any designated nature conservation sites will result from the Proposed Development.

Table 5-13: Summary of potential impacts of KER(s), mitigation measures and residual impacts.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Habitats								
Hedgerows (WL1) & treelines (WL2) **Mixed broadleaved woodland (WD1) & immature woodland (WS2)** **Wet grassland (GS4)**	Local Importance (higher value)	Loss and/or damage of 38 tree on Site. Loss of wet grassland habitat. Trampling and damage to trees identified for retention during the Construction Phase. The landscape design includes extensive planting and provides for pollinator friendly native species and wildlife planting areas.	Negative Negative Negative Positive	Local	Long-term Permanent Short-term Permanent	Moderate Slight Moderate Moderate	Retention of existing treeline and hedgerow habitat according to the Tree Protection Plan (Charles McCorkell, 2023). Planting of 420 new trees. No further mitigation proposed for loss of habitats. Over time, the maturing planted trees and hedgerows will neutralise the effects of habitat loss at the Site. Tree protection measures as outlined in section 5.6.1.3.	Loss of woodland/treelines/hedgerows = Negative, permanent, moderate. Loss of grassland on Site = Negative, permanent, slight.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
The Garrynafela Stream (FW2) and boundary drainage ditch (FW2)	Local Importance (higher value)	Loss of open sections of the Garrynafela Stream due to culvert placement. Surface water discharges from the Site during the Construction Phase leading to a deterioration in water quality within the Garrynafela Stream.	Negative	Local	Permanent Short-term	Slight Moderate	Best practice surface water mitigation measures as outlined in section 5.6.1.2. .	Imperceptible
Fauna								
Small mammals (hedgehog, pygmy shrew, stoat)	Local Importance (higher value)	Risk of injury and/or death as a result of vegetation clearance works and entrapment/ injury due to construction materials. Loss/fragmentation of habitat on Site.	Negative	Local	Short-term Long-term Short-term	Significant Moderate Slight	Clearing of vegetation (i.e. hedgerows, scrub) outside of hibernation period (Outside period November - March). Incorporation of 'hedgehog highways' into	Negative, permanent, slight.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
		Noise, dust and light disturbance during the Construction Phase. Light disturbance during the Operational Phase.			Long-term	Slight	fence design across the Site to ensure habitat connectivity. Range of best practice construction noise and dust controls. Wildlife friendly lighting measures to ensure dark buffer zones.	
Red squirrel, pine marten, badger	Local Importance (higher value)	Reduction in potential foraging/resting habitat for red squirrel and pine marten due to the removal of trees on Site. Reduction in potential foraging habitat for badger. Noise disturbance during the Construction Phase.	Negative	Local	Long-term Permanent Short-term Long-term	Moderate Slight Slight Slight	Phased removal of suitable vegetation on Site Pre-clearance surveys prior to the removal of scrub, treelines and hedgerow habitat on Site. Range of best practise construction noise control measures	Negative, Long-term, Slight.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
		Noise disturbance during the Operational Phase.					as outlined in section 5.6.1.7.	
Bird assemblage	Local importance (higher value)	Mortality/ harm during Construction Phase due to vegetation removal . Disturbance due to noise and dust generated during the Construction Phase. Loss of nesting/foraging habitat on Site (hedgerow, scrub, grassland).	Negative	Local	Short-term Short-term Long-term	Significant Slight Moderate	No removal of vegetation during the nesting bird season. Best practice construction noise and dust control measures to be implemented. Additional tree cover and diverse planting proposed as part of the landscape design for the Site. A series of 6+ bird boxes to be erected on suitable trees along the Site	Negative, long-term, slight.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
							boundaries and vegetated areas	
Bat Assemblage	Local importance (higher value)	Loss/ damage of commuting and foraging habitat (hedgerow, treelines, scrub, grassland). Potential for injury/mortality during tree-felling of roost potential trees. Light disturbance during the Construction Phase. Light disturbance during the Operational Phase	Negative	Local	Long-term Short-term Short-term Permanent	Moderate Significant Moderate Moderate	Removal of vegetation on Site outside of maternity or hibernation period. Pre-felling survey of T1894 and T1895 and any other trees noted to have deteriorated in structure between the time of the survey and the grant of planning permission. NPWS derogation licence is required if bats are present. Wildlife friendly lighting measures as outlined in section 5.6.2.2	Negative, long-term, slight.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation/ Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
							A series of 10+ bat boxes to be erected on suitable trees along the Site boundaries and vegetated areas.	
Otter	Local importance (higher value)	Deterioration in water quality of the Garrynafela Stream and downstream Lough Ree during the Construction Phase, causing disturbance and/or displacement of fish and reduction in prey availability for otter.	Negative	Local	Short-term	Moderate	Mitigation measures to protect surface water quality as outlined in section 5.6.1.2.	Imperceptible
Amphibians and Reptiles	Local Importance (higher value)	Physical disturbance and loss of potential habitat at the Site (grassland, scrub, hedgerows). Injury/death of lizards and amphibians if present during Site clearance.	Negative	Localised	Permanent	Moderate Significant	Specific methodology for protection of lizard to be followed when clearing vegetation (section 5.6.1.4.4).	Imperceptible

5.8 Monitoring

5.8.1 Construction Phase

Regular monitoring will be carried out by the contractor to ensure water quality protection measures (e.g., straw bales, silt fences and swales) are working throughout the entire Construction Phase. All containment and treatment facilities will be maintained and inspected regularly based on Site and weather conditions for any signs of contamination of excessive silt deposits and records of these checks will be maintained.

5.8.2 Operational Phase

The proposed landscape scheme will be maintained and any plants that die, become diseased or damaged or are removed within 5 years will be replaced within the following planting season by plants of a similar size and species.

5.9 Interactions

This chapter pertaining to the ecological and biodiversity aspects of the Proposed Development, has the potential to interact with aspects of the following chapters of this EIAR:

- Chapter 6: Land and Soil;
- Chapter 7: Hydrology;
- Chapter 8: Air Quality and Climate;
- Chapter 9: Noise and Vibrations;
- Chapter 10: Landscape and Visual Assessment; and
- Chapter 12: Material Assets.

5.9.1 Land and Soil

An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment; with emphasis on the impact of the Proposed Development on the receiving soils underlying the Site during the Operational Phases of the Proposed Development, is described in Chapter 6 - ‘Land and Soil’ of this EIAR. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are described in full in Chapter 6. The bulk removal of soils, sands and gravel at the Site can have implications for biodiversity. Natural regeneration of native and local seeds is the preferred option for re-vegetating areas to be retained for biodiversity.

5.9.2 Hydrology

The key environmental interaction with biodiversity is water. An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is described in Chapter 7 - ‘Hydrology’ of this report as well as in his Chapter, to ensure the quality (pollution and sedimentation) and quantity (surface water run-off) of water is of appropriate standard. Interactions between hydrology and biodiversity can occur through impacts to water quality, arising, for example from an accidental pollution event during the Construction and Operational Phase. This interaction has the potential to result in impacts on habitats and fauna that are hydrologically linked to the Site via the Garrynafela Stream.

5.9.3 Air Quality and Climate

An assessment of the potential impact of the Proposed Development on air quality and climate is included in Chapter 8 of this EIAR. Dust emissions arising from the Construction Phase of the Proposed Development were identified as having potential impacts on local biodiversity. Once dust minimisation measures are implemented, impacts to biodiversity are not predicted to be significant.

5.9.4 Noise and Vibration

An assessment of the potential impact of the Proposed Development in the form of excess noise and vibrations associated with the Proposed Works are laid out in Chapter 9 - 'Noise and Vibrations'. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 9. There is potential for interactions between noise and sensitive fauna, e.g., birds, that occur in adjacent habitats from increased noise levels during the Construction Phase. However, as described, noise related impacts are not deemed to be significant.

5.9.5 Landscape and Visual Assessment

An assessment of the potential impacts of the Proposed Development on the surrounding landscape character is outlined in Chapter 10 – Landscape and Visual. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 10. Landscaping at a development site can have significant implications for biodiversity. The landscape plan for the Proposed Development includes an area to be retained for biodiversity. The lighting plan for the Site has also been sensitively designed to protect bats from light pollution. Significant negative effects are not predicted.

5.9.6 Material Assets

Construction waste arising from Site operations could negatively affect local fauna through entrapment, for example. However, appropriate waste management practices on Site will ensure no significant effects occur on local biodiversity.

5.10 Difficulties Encountered When Compiling

No difficulties were encountered during the compilation of this EIAR Biodiversity Chapter.

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6 LAND AND SOIL

6.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the land, soils and geology within and immediately surrounding the Proposed Development Site, an assessment of the potential impacts of the Proposed Development on land, soils and geology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Land, soils, and geological characteristics of the receiving environment at the Site.
- Potential impacts that the Proposed Development may have on land, soils and geology including “worst case” scenario assessment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development; and
- Evaluate the significance of any residual impacts.

6.1.1 Quality Assurance and Competence

This chapter of the EIAR was written by Sam Marchant MSc., BSc, who is a Hydrogeologist with Enviroguide Consulting experienced in hydrogeological and geological impact assessments. The chapter was reviewed by Claire Clifford BSc., MSc., PGeo., EurGeol who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide Consulting and is a Professional Geologist with the Institute of Geologists of Ireland and has extensive experience in preparing environmental assessments for a range of project types and geological and hydrogeological site settings.

6.1.2 Description of the Proposed Development

The Applicant intend to apply to Westmeath County Council for a 10-year permission for a Large-scale Residential development on these lands at Ballykeeran and Cornamaddy Townlands, Athlone, County Westmeath. Chapter 02 sets out a description of the Proposed Development. Figure 6-1 shows the layout of the Proposed Development.

Figure 6-1: Proposed Site Masterplan (Refer to Architecture Drawing, Proposed Site Masterplan 100 (Arnold Leahy Architects)

6.2 Study Methodology

6.2.1 Regulations and Guidance

The methodology adopted for the assessment takes cognisance of the relevant guidelines in particular, the following:

- S.I. No. 92 of 2011- European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment including amendments S.I. No. 52 of 2014.
- S.I. No. 98 of 2008- European Parliament and of the Council on waste and repealing certain Directives.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022)

- Environmental Protection Agency, 2002. Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002).
- Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003).
- Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002).
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013); and
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009)

6.2.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An Assessment and Impact Determination stage was carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of land, soils and geological environment, to establish the activities associated with the Proposed Development and to undertake an assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Proposed Development Site and receiving environment.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Proposed Development Site. The study area, for the purposes of assessment the baseline conditions for the Land, Soils and Geology Chapter of the EIAR, extends beyond the Site boundaries and includes potential receptors with which there may be a pathway to from the Proposed Development and receptors that may be indirectly impacted by the Proposed Development. The extent of the wider study area was based on the IGI, 2013 Guidelines which recommend a minimum distance of 2.0km from the Site.

The desk study involved collection all the relevant data for the Proposed Development Site and surround areas including published information and details pertaining to the Proposed Development provided by the Applicant and design team.

A site walkover survey to establish the environmental site setting and baseline conditions at the Proposed Development Site relevant to the land, soil and geology environment was undertaken by Enviroguide Consulting on the 28th of September 2022.

The Element 1 stage of the assessment was completed by Enviroguide Consulting and included review of the following sources of information:

- Environmental Protection Agency (EPA) web mapping 2023.
- GSI Datasets Public Viewer and Groundwater web mapping, 2023.
- Google Earth Mapping and Imagery (Google Earth, 2023).
- Ordnance Survey Ireland (OSI) web mapping 2023.
- National Parks and Wildlife Services (NPWS) web mapping (NPWS, 2023).
- Teagasc web mapping (Teagasc, 2023).

- Information provided by the Applicant including.
    - Information pertaining to the design proposals for the Proposed Development
    - Stratex (2022) Ground Investigation Report.

Element 2: Involves Direct and Indirect Site Investigation and Studies stage where necessary to refine the conceptual site model developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development. It was determined based on professional judgement that in accordance with industry best practice and standards there was adequate scientific data and site-specific information on the subsurface and geological conditions at the Site to inform the impact assessment of the Proposed Development Site on the receiving land, soil and geology environment.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Land, Soil and Geology sections of the EIAR in this Chapter which includes all the associated figures and documents.

6.2.3 Description of Importance of Receiving Environment

The Transport Infrastructure Ireland (TII) criteria for rating of the importance of geological features at the Site as documented in the National Roads Authority Guidelines (NRA, 2009), are summarised in Table 6-1.

Table 6-1: Criteria for Rating Site Importance of Geological Features

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	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). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil on-site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.

Importance	Criteria	Typical Example
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

6.2.4 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter is described in Table 6-2.

Table 6-2: Assessment of Potential Terminology and Methodology

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**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	An effect which causes noticeable changes in the character of the environment 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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	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
Reversible	Effects that can be undone, for example through remediation or restoration

6.3 The Existing and Receiving Environment (Baseline Situation)

6.3.1 Site Location and Description

The Site of the Proposed Development is located in Cornamaddy and Ballykeeran, Athlone Co. Westmeath. The Site lies to the northwest of the N55 roads. The site is currently

predominately greenfield with surrounding land use comprises of residential, commercial, and civic land use. The BMW Athlone commercial development is located to the east of the Proposed Development. Resident properties and greenfield lands are located to the south of the Site. The west of the Site is currently undeveloped lands (subject to a current planning application). The north of the Site is bound by an unnamed local road with residential developments.

6.3.2 Current and Historical Land use

The site is predominately greenfield currently used for grazing of livestock.

The site is located within the functional area of the Athlone Town Development Plan 2014-2020 (ATDP) and covered areas zones as proposed residential, existing residential and open space.

Within the Athlone Town Development Plan (WCC, 2014), the Site of the Proposed Development is located on lands indicated as 'Proposed Residential' and 'Open Space'. The Proposed Development Site forms part of the "Cornamaddy Action Area Plan – 2005", where the lands have a land zoning predominately of "Residential (Low – Medium Density)" with an area zoned as "Open Space" along the west of the Site (Athlone Town Council, 2005).

Historical mapping and serial photography available from the Ordnance Survey of Ireland website (OSI, 2022) and Google Earth (Google Earth, 2022) were reviewed and key observation on-site and offsite are summarised in Table 6.3. The current Site used Aerial photograph is shown in Figure 6-3.

Table 6-3: Historical Land use

Date	Information Source	Site Description
1837-1842	**OSI map 6inch**	**On-site:** The Proposed Development is shown as open fields divided by field boundaries. Drainage is shown entering the Site from the east, flowing west to the centre of the Site, and then flowing north. There is a small undetermined building and pathway to the southeast of the Site. **Off-site:** The surrounding lands are predominantly fields with divided by field boundaries with a number of unidentified houses in the surrounding lands.
1888-1913	**OSI map 25inch**	**On-site:** The Site remained undeveloped. The field boundaries have changed. The drainage has been altered and now extends to the western boundary of the Site before being direction to the north. There is a small undetermined building and pathway to the southeast of the Site. **Off-site:** There is a spring noted immediately south of the Site Boundary, with an arrow pointed to the west. Cornamaddy school is present approximately 200m south of the Site.
1830-1930	**OSI Cassini map 6inch**	**On-site:** The field boundaries have been altered; the fields have been opened up. **Off-site:** Reference to spring has been removed. Flow arrow present to the northwest of the Site boundary indicating flow is to the north. There is a cemetery is present approximately 500m to the southwest of the Site.

Date	Information Source	Site Description
1995	**OSI Aerial photography**	**On-site:** New building present to the southeast of the Site. Ground disturbance (appears as topsoil removed from small patch) to the southwest of the Site. **Off-site:** Houses present directly south and southeast of the Site boundary. Cut peat field present approximately 570m to the southeast of the Site.
2004-2006	**OSI Aerial photography**	**On-site:** No significant changes. **Off-site:** No significant changes.
2005-2012	**OSI Aerial Photography**	**On-site:** The roof of the building to the southeast of the Site has been removed. Google earth 2007 aerial photograph (google, 2022) indicates the building has been demolished and a mound of material present at the former location. **Off-site:** New housing development south of the development.
2013-2018	**OSI Aerial photography**	**On-site:** Vegetation growth is increasing overtime on mound to at the former building site to the Southeast of the Site (Google Earth, 2022). **Off-site:** No significant changes.
2022	**Google Maps Photography / Site Walk Over.**	**On-site:** No significant changes, in channel works were taken place during the Site walkover by local farmer, including cutting back the riverbank and removing sediment from the Garrynafela Stream. The mound to the southeast of the Site was inaccessible due to extensive vegetation growth. **Off-site:** No significant changes.

Figure 6-2: Bing Aerial Photograph

6.3.3 Licensed Sites

There are no mapped EPA licensed facilities within a 2km radius of the Proposed Site Boundary (EPA, 2023).

6.3.4 Topography

The topographical survey of the Proposed Development Site indicates that the overall topography ranges from approximately 48.75m above ordnance datum (mOD) in the southwest to approximately 39.65m AOD to the central west of the Site. In general, the Site is gently sloping to the west.

- The topographic high of 48.75m is associated with a mound contained within a brick wall to the south-east of the Site (refer to Drawing 2020-P302-104 in Appendix G). The mound likely comprises demolished materials from the building present on Site up to 2007 (see Table 6.3 for further details).
- There is a small hill to a maximum height of 43.46m in the northern centre of the Site.
- Map indicates the present of a possible septic tank north of the mound (refer to drawing 2020-P302-101-0 in Appendix G.
- The Shannon (Upper)_110 river (Garrynafela Stream) is located in the centre of the Site, flows from east to west and changes to a northly direction at the western boundary of the Site. The invert level of the river is 38.1mOD in as it leaves the Site.
- Two rock outcrops are mapped in the centre field of the Proposed Development during the topographic survey (refer to drawing 2020-P2302-100, Rocktop 2020, in Appendix G). These are not mapped as an outcrop in the GSI bedrock geology database (GSI, 2023). These were noted as vegetated areas with boulders during the Site walkover, manmade materials were also present (plastic sheeting).

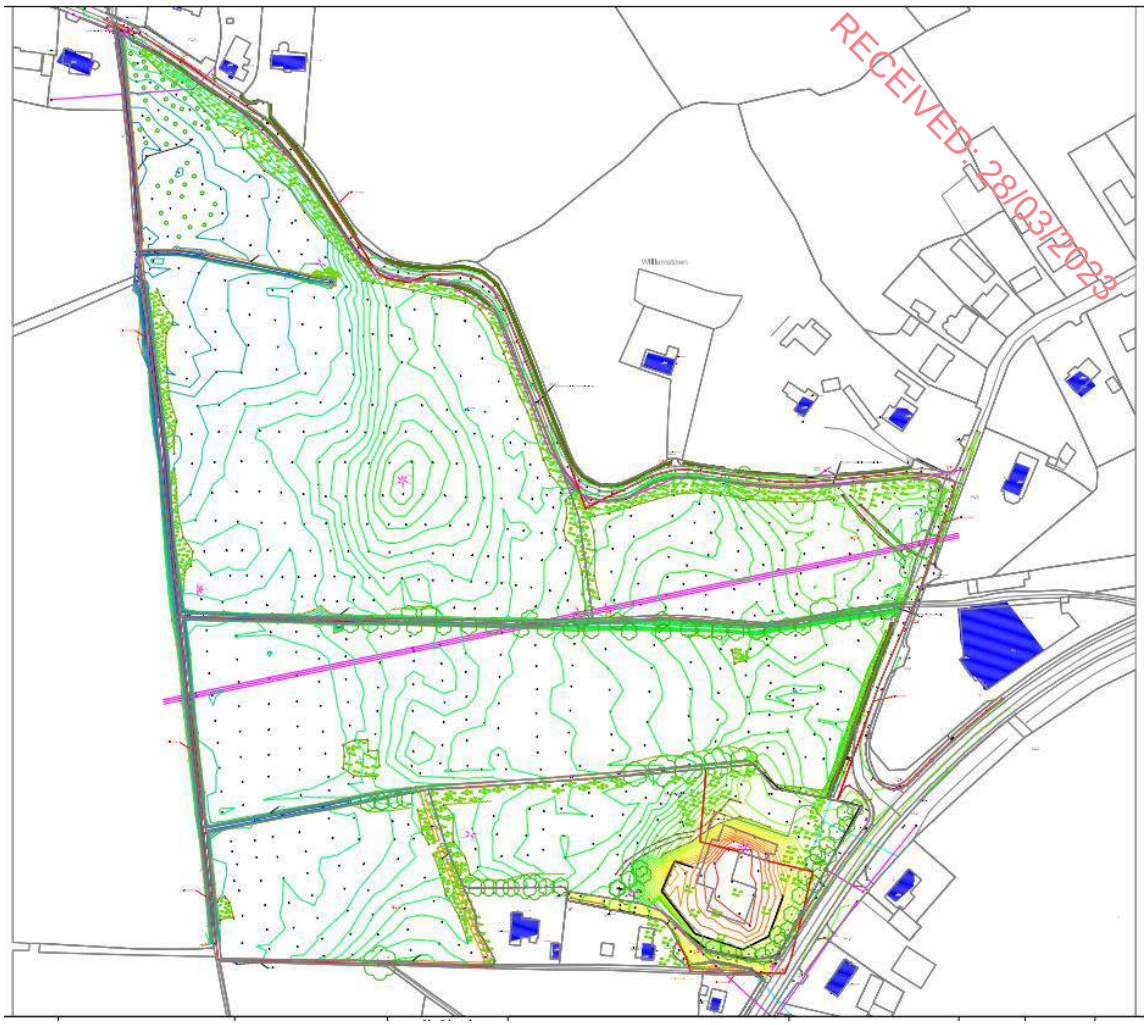

Figure 6-3: Topographic Map (Refer to Drawing 2020-P302-100, Rocktop (2022) refer to Appendix G)

6.3.5 Soils

The soils beneath the Proposed Development Site have been mapped by Teagasc (Teagasc, 2023) as the following:

- BminSW- Shallow well drained mineral (mainly basic) with an IFS soil description of "derived from mainly calcareous parent material". Parent material is glaciofluvial sands and gravels, present to the east of the Site.
- Basin Peats with an IFS soil description of "Fen Peat" are present to the west of the Site.

The Teagasc soil map is shown in Figure 6.4 below.

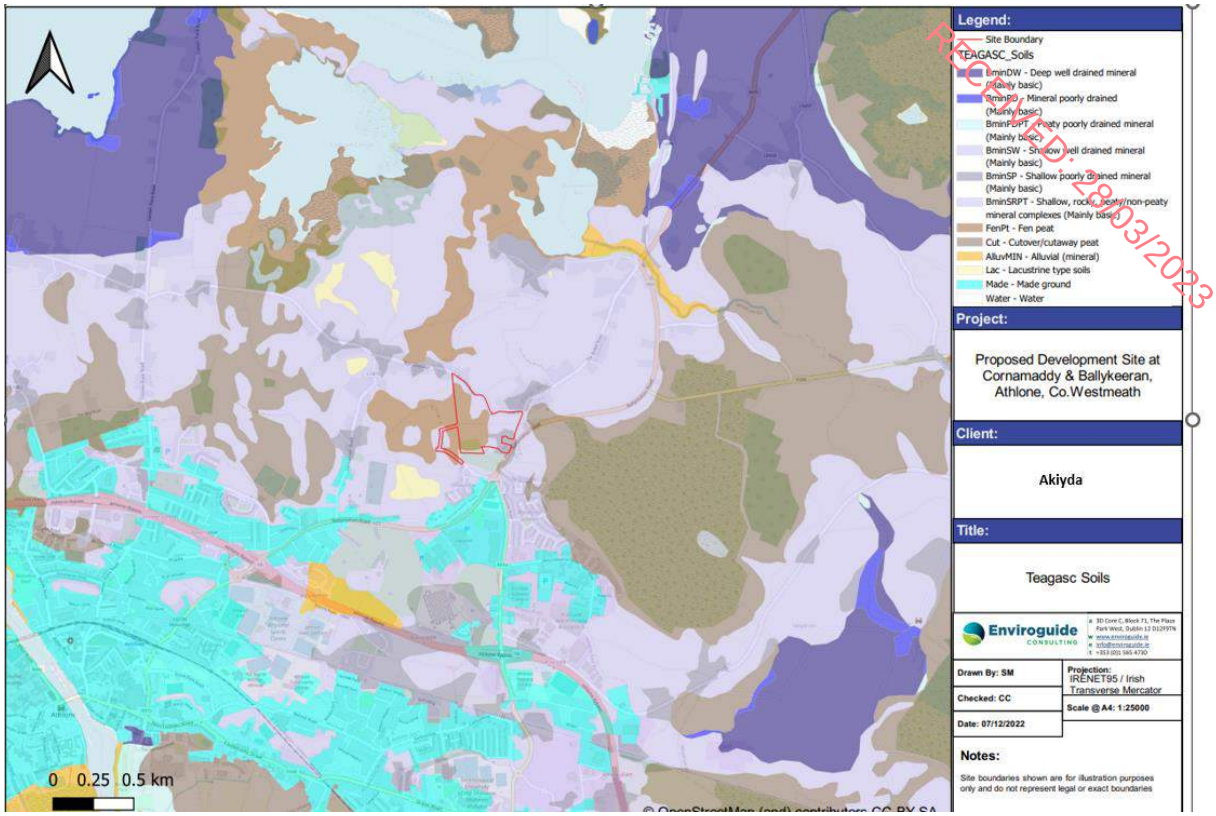

Figure 6-4: Teagasc Soils

6.3.6 Quaternary Soil

The quaternary sediments beneath west of the Site are mapped as Fen Peat (FenPt). The quaternary sediments beneath the east of the Site are mapped as gravels derived from limestone (GLs). The quaternary geology of the Proposed Development Site is presented in Figure 6-5.

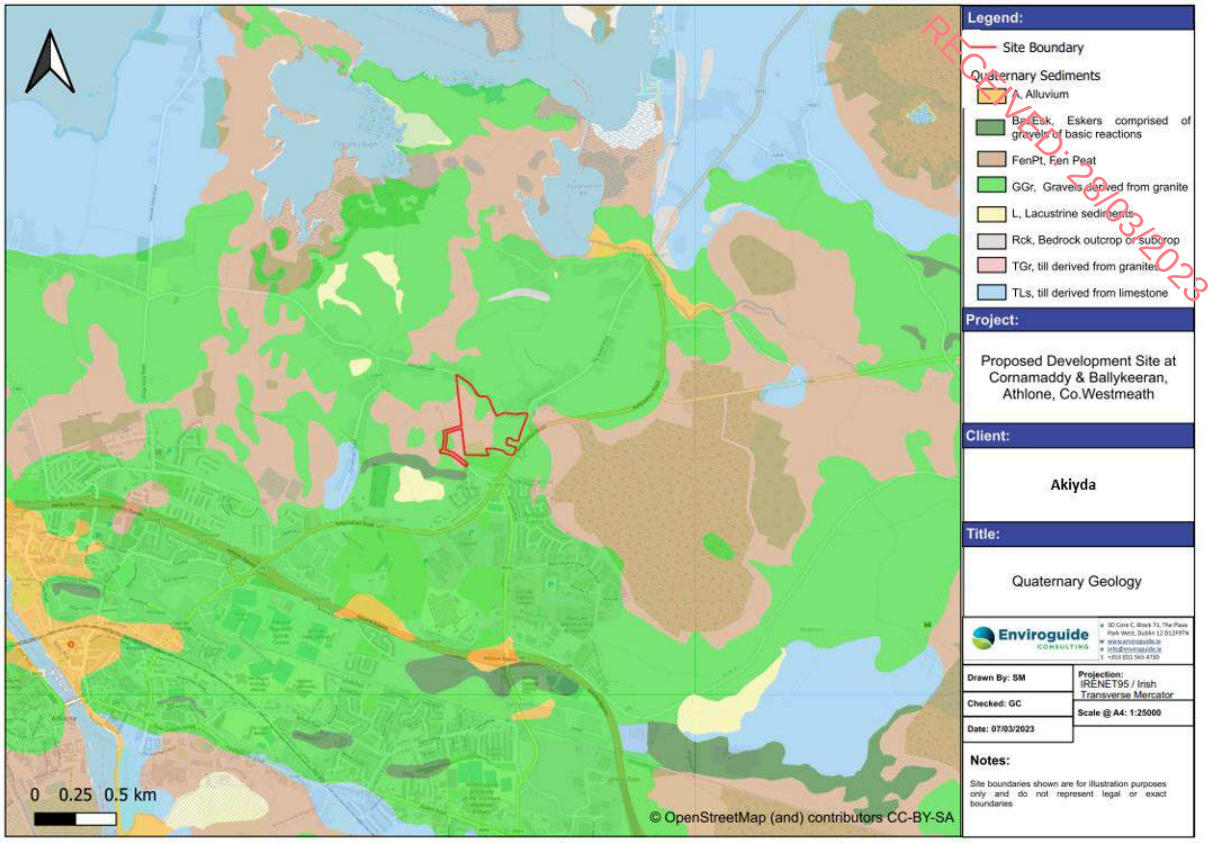

Figure 6-5:Quaternary Sediments

6.3.7 Quaternary Geomorphology

Quaternary geomorphology is mapped by the GSI within the Site boundary. The Athlone gravels are mapped as a deglacial landform 'hummocky sand and gravel'.

There are several meltwater landforms within the 2km radius south of the Proposed Site generally in an east-west orientation. The esker ridge meltwater landforms are classified by the GSI as "long bead- subglacial tunnel fill" and are summarised in Table 6-4 below.

Table 6-4: Long bead-subglacial tunnel fill

Location	Distance from Site (km)	Slope Percent
South	0.12	-0.19
South	1.3	0.32
South	1.3	0.45
South	1.9	-0.04

6.3.8 Bedrock Geology

Based on the GSI database (GSI, 2022), the bedrock beneath the Proposed Development is mapped as Waulsortian Limestone (Stratigraphic Code: WA, New Code: CDWAUL) which is comprised of 'massive, unbedded lime-mudstone'. The Waulsortian limestones are over 1200m thick in the Shannon Estuary area but more typically 300-500m thick.

Lucan Formation comprising of dark limestone and shale (Stratigraphic code: LU, New Code: CDLUCN) is located 0.22km east and 0.95km north of the Proposed Development Site.

Bedrock outcrops are present approximately 1.25km northeast of the Proposed Development. The bedrock map is shown in Figure 6-6. There are no mapped bedrock outcrops noted by the GSI within the Site boundary.

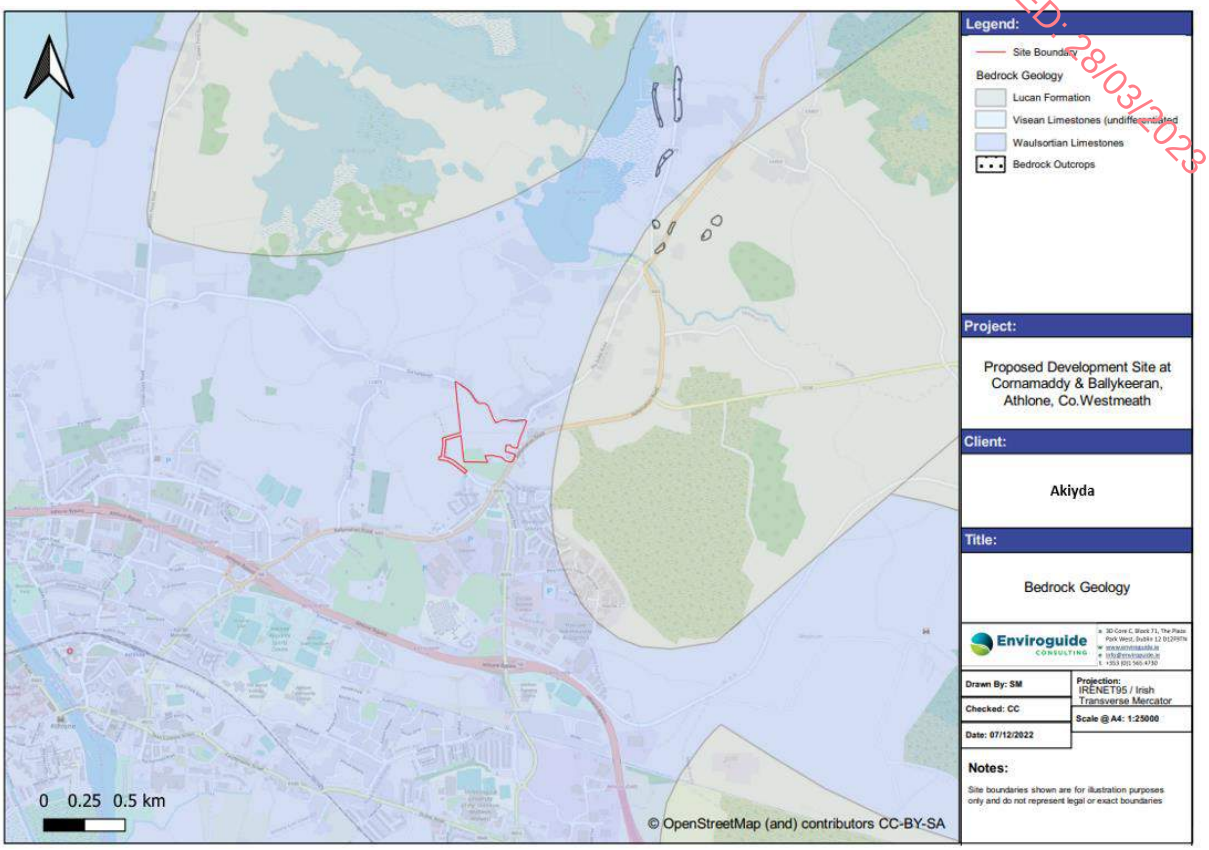

Figure 6-6: Bedrock Geology Map

6.3.9 Site Investigation Results

A geotechnical investigation in relation to the Proposed Development was undertaken by Stratex Site Investigation and Geotechnical Engineers (Appendix F). The site investigation locations are shown in Figure 6.7.

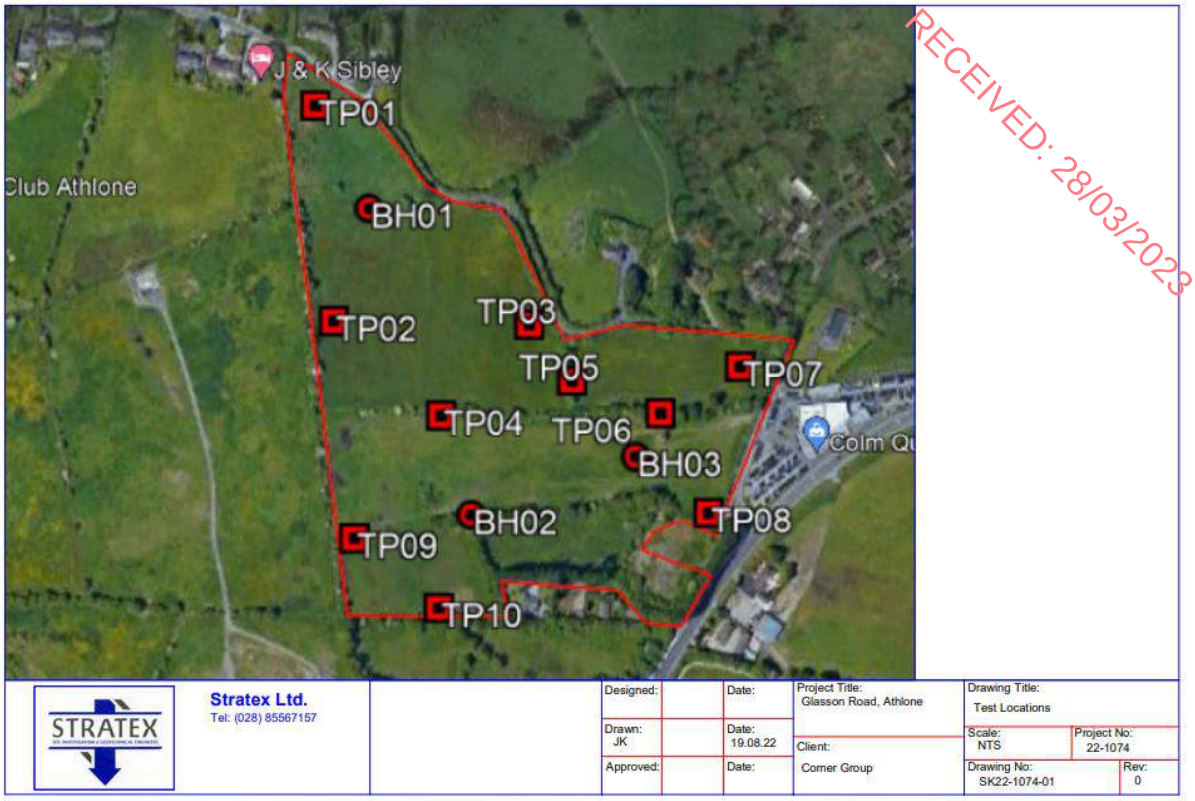

Figure 6-7: Ground Investigation Location (Stratex Ltd, 2022 refer to Appendix F)

The ground investigation included the following:

- Three percussion boreholes ranging in depth from 2.7 to 4m, with standards penetration tests (SPTs);
- Ten trial pits ranging between 2.6 and 3.2m.

The ground conditions as described in the Stratex report are summarised below:

- Peat at BH01, BH02, TP2, TP9 and TP10. Peat was generally only encountered from ground level except for TP9 where a 0.2m band of peat was also noted at 1.3mbgl in additional to at the surface. Peat depth from the surface ranged from 0.3m (TP2) to 0.9m (BH1).
- Drift material was noted at all locations and included clays, silts, sands and gravels. Termination generally occurred due to refusal at boulder deposits. Sand & gravels were encountered in all locations except for TP3.
- No bedrock was encountered during the ground investigation i.e. no rock to 4.0mbgl

Groundwater strikes were encountered in TP1, TP4 and TP9 at the following depths:

- TP1 at 1.3mbgl in Gravel
- TP4 at 1.6mbgl in Gravel
- TP9 at 2.7mbgl in Sand

The report notes the Site is generally not suitable for any major unsupported excavation, with the underlying natural deposits partial to collapse. Trench fill foundations are required up to a depth of 1.9mbgl to transfer the structural loads of the building to below any made ground, peat or soft/ loose natural material to bear to the underlying firm to stiff/ dense deposits (Stratex 2022, Appendix F).

6.3.10 Geotechnical Domain

The GSI (GSI, 2023) defined Geochemical Domains map indicates that the Proposed Development is within Doman 2 which is characterised as 'carboniferous limestone, shale and related rocks'.

A summary of the maximum concentrations and/ or soil trigger levels for metals in geochemical domain 2 are presented below in Table 6.5.

Table 6-5: Geochemically Appropriate Levels from Domain 2

Element	Units	Value
Arsenic	mg/kg	24.9
Cadmium	mg/kg	3.280
Chromium	mg/kg	50.3
Copper	mg/kg	63.5
Mercury	mg/kg	0.36
Nickel	mg/kg	61.9
Lead	mg/kg	86.1
Zinc	mg/kg	197

6.3.11 Radon

The Site is mapped by the EPA (EPA, 2023) as being in an area where "about 1 in 10 homes in this area is likely to have high radon levels"

The EPA cite the reference level for radon as 200 Bq/m^3 and a High Radon Area where more than 10% of homes may have more than the reference level of radioactivity. As up to 10% of the houses in the area are mapped by the EPA as being over this reference level it indicates that the Site is not considered a High Radon Area however, it is noted that a high radon level can be found in any home, in any part of the country.

6.3.12 Geohazards

The GSI (GSI, 2022) records for karst features indicate that there are no karst features within a 2km radius of the Proposed Development Site. The closest karst feature (cave) is located in the Lucan Formation located approximately 2.05km northwest of the Proposed Site Boundary.

The Site is located within an area of "Low" and "Inferred Low" Landslide susceptibility classification (GSI, 2022). There is no recorded landslide within a 2km radius of the Proposed Development Site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network operated by Dublin Institute for Advanced Studies (DIAS) which has been recording seismic events in Ireland since 1978. There are six permanent broadband seismic recording stations in Ireland operated by DIAS. Records since 2010 show that the majority of recorded seismic events

were associated with quarry blasts and no recent events have been recorded within 2km of the Proposed Development Site.

6.3.13 Geological Heritage

A review of the GSI Geological Heritage Database (GSI, 2023) indicates one geological heritage Site located within 2km radius of the Proposed Development which is summarised in Table 6-6 and shown in Figure 6-8.

Table 6-6: Sites of Geological Importance within 2km of the Proposed Development

Site Name	Site Code	Location	Distance from Site (km)	Geological Importance
Tullin Mushroom Rock	WH027	Northwest	1.3	An isolated, single, undercut limestone mushroom rock, situated in woodland

An esker is a mapped on the GSI 'Quaternary Sediments' map southwest of the Site access road (GSI, 2023) (refer to Figure 6-5). The esker is not mapped or listed in the GSI Geological Heritage Database and not included in the "Geological Heritage of County Westmeath" audit report in 2019 (GSI, 2019).

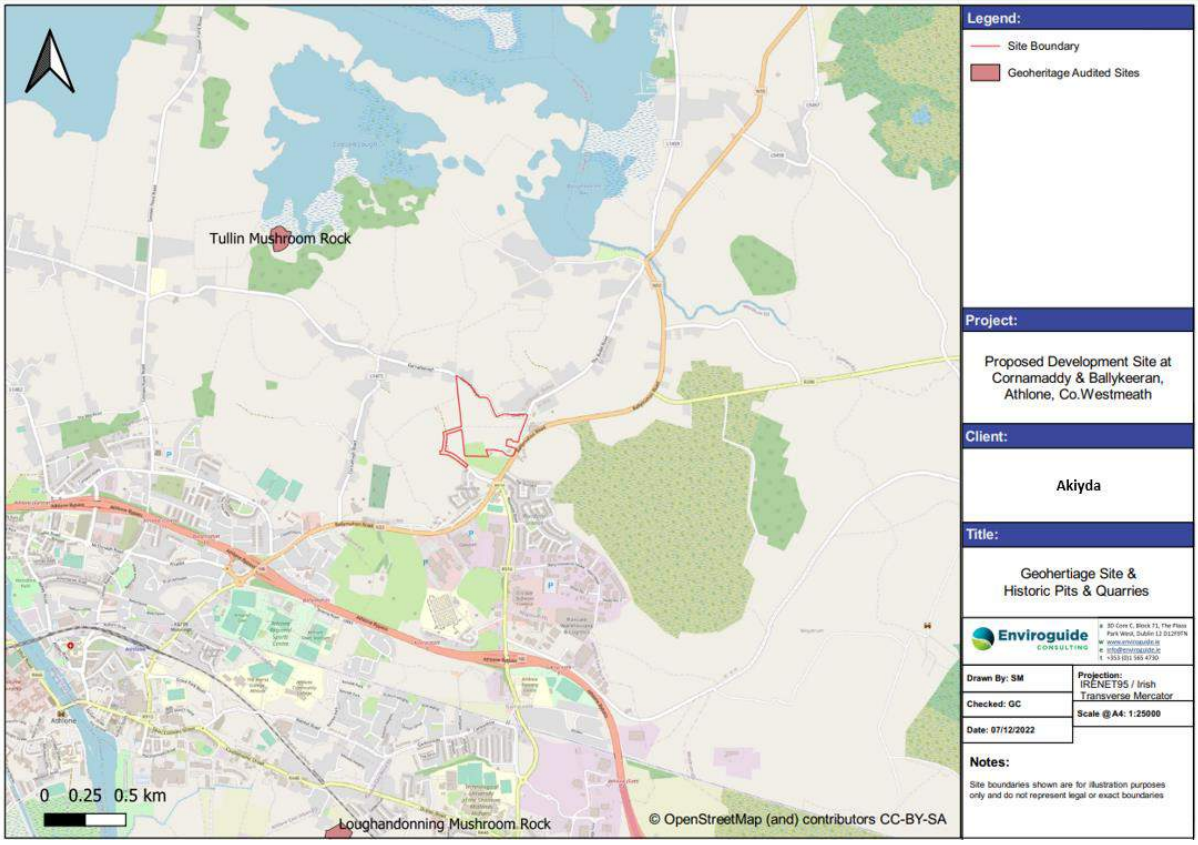

Figure 6-8: Geoheritage Sites

6.3.14 Economic Geology

The GSI granular aggregates potential database indicate the gravels (derived from granite) underlying the west of the Site to have “very high potential” (refer to Figure 6-9).

The bedrock beneath the Site has been identified by the GSI as having a “low potential” for crushed rock aggregate potential. There are a number of historical pits and quarries mapped by the GSI (GSI, 2023) located within a 2km radius of the Proposed Development Site which are listed in Table 6-7.

Table 6-7: Historical Pits and quarries located within 2km of the Proposed Development Sites

Name/Type	Status	Distance from Proposed Development(km)	Location from Site
Pit	Historic	0.60	East
Pit	Historic	0.71	East
Pit	Historic	0.78	Northeast
Pit	Historic	0.91	Northeast
Quarry	Historic	1.55	Northeast
Quarry	Historic	1.75	Northeast
Pit	Historic	0.67	Southwest
Quarry	Historic	1.73	West
Pit	Historic	1.94	Southwest
Pit	Historic	1.75	South
Pit	Historic	1.91	South
Pit (1975 to 1995)	Historic	0.85	Northeast

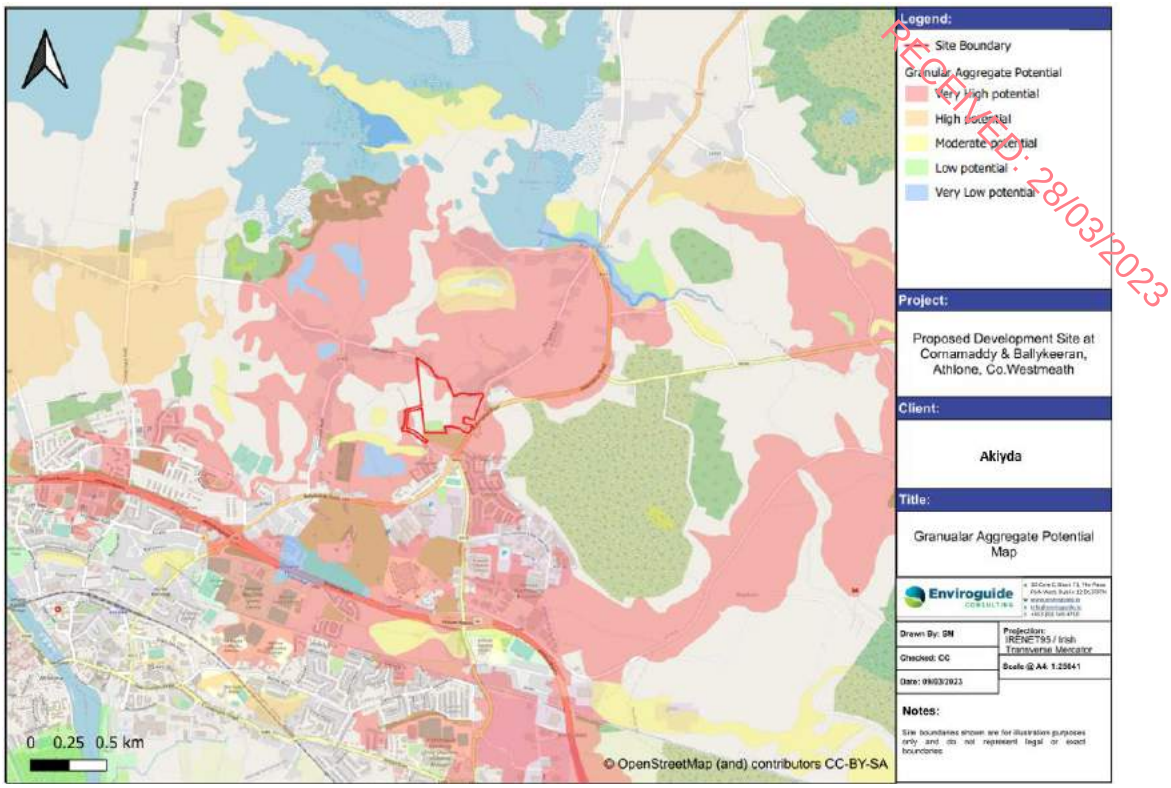

Figure 6-9: Aggregate Potential Map

6.3.15 Importance of Receiving Environment

In accordance with criteria in Table 6-1, the soil and geology underlying the Proposed Development Site is rated as “medium” importance. The medium attribute is considered due to the economical extractable mineral resource values of the gravels located beneath the east of the Site which have a ‘very high’ granular aggregate potential.

6.4 Characteristics of the Proposed Development

6.4.1 Construction Phase

The construction phase of the Proposed Development will include:

- Groundworks and excavation will be required to reduce levels to construct the Proposed Development including foundations, utilities and roads.
- The volumetric analysis (EOBMS, 2023e dwg no. 22-017-041) provided the following volumes for cut and fill:
  - Cut – 5,814.2 m^3
  - Fill – 10,489.7 m^3
  - Net – 4,675.5 m^3 (fill)
- The design requires that 5,814m^3 of material will be excavated and it is intended that all suitable excavated materials will be reused on site.
- The Proposed Development will include the importation of aggregates for the construction of utilities and roads, where there is a net shortfall of 4,675m^3 from excavated material onsite.
- Foundations solutions will be designed to suit ground conditions
- Use of temporary port-a-loo facilities for the duration of the Construction Phase.

- Removal of old septic tank if identified on site

6.4.2 Operational Phase

The Site will be a residential development during the Operational Phase.

There will be no excavation of soil or bedrock during the Operational Phase of the Proposed Development.

6.5 Potential Impact of the Proposed Development

6.5.1 Construction Phase

5.1.1.1 Direct

Land Take and Land Use

The Proposed Development will result in a land take from greenfield undeveloped lands to mixed use residential (i.e. apartments and houses). The Site will be developed in accordance with the zone objective of Westmeath County Council Development Plan (WCC, 2005) and the Athlone Town Development Plan (WCC, 2014). The change of land use and land take will result in a “negative” “significant” and “permanent” impact on the land with the loss of predominantly greenfield land.

Soil Quality and Contamination

The excavation and re-use of soil onsite and removal of any surplus soil during construction will be subject to control procedures which will include soil quality test to ensure suitability for use on-site and for removal offsite in accordance with engineering and environmental specifications for the Proposed Development.

Environmental soil testing will be undertaken prior to any potential contaminated material being removed from the Site (AWN, 2022b). Thus, the mound and possible septic tank located in the southeast will be subject to sampling and waste classification prior to removal. Material will be removed from Site in accordance with all legislative requirements and the RWMP (AWN, 2022b).

There is a potential risk associated with the use of cementitious materials during construction of subsurface structures (such as foundations) on the underlying soil and geology at the Proposed Development. It is considered that this may result in a ‘negative’, ‘slight’ and ‘long-term’ impact on existing quality of soil within a localised area underlying the Proposed Development.

The potential accidental release of deleterious materials including fuels and other materials being used on-Site, through the failure of secondary containment or a materials’ handling accident on the Proposed Development could potentially result in a ‘negative’, ‘moderate’, ‘long-term’ impact on the receiving soil and geology depending on the nature of the incident.

There is a potential risk associated with spillage of untreated foul water to ground during emptying of the welfare facility on Site. All removal and disposal of wastewater from the Site welfare facilities, will be carried out by a fully permitted waste collector. In the event of handing error and failure of containment measures, there is a potential ‘negative’ ‘slight’ and ‘medium

term' impact on the existing quality of soil within a localised area underlying the Proposed Development.

Soil Structure

It is anticipated that all excavated soil will be reused on Site (5,814.2m^3) (EOBMS 2023e, dwg no. 22-017-041). The excavation of soils for reuse at the Proposed Development will result in the exposure of materials to various elements including weather and construction traffic. Soils pending reuse onsite will be stockpiled in a controlled manner with a potential 'negative', 'slight' and 'long-term' impact on the natural strength of the material.

Imported Aggregates

The Proposed Development will include the importation of aggregates during the Construction Phase of the Proposed Development.

In order to minimise the requirement to import virgin quarried materials, recycled aggregates will be used where available and subject to meeting specified design requirements and all current construction and environmental legislation. This will include where suitable, by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011 and other applicable statutory requirements. All imported material will require certification from suppliers that the imported soils and other fill/landscaping materials are free of Invasive Alien Plant Species (IAPS).

In the unlikely event that aggregate materials are sourced from unlicensed or unauthorized sources, it may result in the importation of contaminated materials, uncertified materials, or material not suitable for use at the Proposed Development. In the unlikely event of the importation of contaminated materials onsite, there would be a 'negative', 'moderate to significant' and 'long term' impact on the receiving lands, soil and geology at the Proposed Development.

Geotechnical and Ground Conditions

The design of the Proposed Development includes for the construction of residential properties with foundations. The ground investigation report noted that the areas is not suitable for major unsupported excavation with the underlying natural deposits partial to collapse to its natural angle of repose. These site conditions could result in potential ground stability hazards during trench operations during construction with potential for ' negative', 'moderate' and 'long term' impact. However, appropriate geotechnical design avoidance and reductive measures will be incorporated into the design to prevent any potential impact during the construction phase.

5.1.1.2 Indirect

Soil for Excavation & Removal

It is anticipated that all material excavated during the Construction will be reused onsite (pending suitability assessment). In the scenario, where additional soils are generated for removal, the removal of soils will be managed in accordance with all statutory obligations. Surplus material to be removed offsite will be reused as a by-product under Article 27 by-product notification or sent for recovery at a suitable authorised facility. Disposal of material

will be considered only if re-use and recovery are not feasible. The receiving waste facilities will be appropriately licenced/permitted to accept the surplus soil and stone and the potential impacts will therefore have been adequately assessed and mitigated. Conditions for material to be consider under Article 27 are set out by the EPA to ensure material is suitable for reuse in the designated facility. Accordingly, it is considered that offsite removal and recovery will have a 'neutral', 'negligible' and 'permanent' impact on the receiving Site.

Importation of Fill Materials

The Proposed Development will include the importation of aggregates during the Construction Phase for the construction of filter drains at the Proposed Development. The potential impacts may include loss of attribute and changes in the geological regime at the source site. It is anticipated that the required aggregates identified for importation onsite will have a 'neutral', 'imperceptible' and 'permanent' impact on the source Site taking account of the fact that the statutory consent process would have required the necessary environmental impacts to be assessed and mitigated as appropriate at the source site.

5.1.1.3 Secondary

There will be no secondary impacts associated with the Construction Phase of the Proposed development.

6.5.2 Operational Phase

5.1.1.4 Direct

During the operational phase of the of the Proposed Development there is limited potential for any direct adverse impact on the receiving land, soil and geological environment at the Proposed Development Site taking account of the proposed design measures for the Proposed Development.

The design and construction of the Proposed Development in accordance with current Building regulations will ensure that the Site will be suitable for use for the Operational Phase as a residential development taking account of the geological site setting including the identified potential ground stability issues.

There will be limited discharge to ground from the SuDs and rainfall (to open areas). There will be no bulk storage of petroleum hydrocarbon-based fuels used during the Operational Phase. All trafficked areas will be paved and connected to the surface water drainage network and therefore in an unlikely scenario of an accidental spill from a vehicle there will be no discharge or potential impact to the ground and receiving land, soil, and geology environment. In a worse-case scenario, of a spill incident and failure of containment, there is a potential "negative", "moderate to significant" and "long-term.

There is no identified potential human health impact associated with the soil and geological environment at the Site.

Geotechnical and Geological Hazards

Earthquakes are not likely to occur in the vicinity of the Site at a sufficient intensity to pose a risk for the Proposed Development. The Site is located within an area of 'Low' susceptibility to landslides. There is no identified risk associated with landslides.

The Site is not located within an area associated with karst geology and therefore there are no identified risks associated with karst features.

The Site is identified as not being located within a High Radon Area however, as a high radon level can be found in any area thus there is a potential risk. The potential for ingress of ground gases including radon or gases associated with organic content of soil will be addressed through standard building design measures including the installation of appropriate membranes.

The Site Investigation Report did not reference any issues associated with pyrite. All aggregates imported to the Site for use in the Proposed Development will be subject to strict quality control procedures in accordance with the design specification and relevant Building Regulations therefore avoiding any potential issues with pyrite in aggregates.

Overall there is no identified geotechnical or geological hazards associated with the land soil and geological condition associated with the Proposed Development or that may impact on the Operational Phase of the Proposed Development of human health of the occupants of the Proposed Development.

5.1.1.5 Indirect

There will be no indirect impacts associated with the Operational Phase of the Proposed Development.

5.1.1.6 Secondary

There will be no secondary impacts associated with the Operational Phase of the Proposed Development.

6.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as “impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”. Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

Existing Planning Permissions

A number of relevant planning applications have been lodged previously for lands in the vicinity of the Proposed Development Site. As outlined Table 6-8, the cumulative effects of the Proposed Developments on the hydrological and hydrogeological environment have been assessed taking other planned, existing and permitted developments in the surrounding area into account.

Table 6-8: Existing Planning Permissions

Planning Ref No.	Applicant Name	Summary of Development
22253 26/10/2022	Marina Quarter Ltd	The development will consist of the following: • Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24

Planning Ref No.	Applicant Name	Summary of Development
		no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces; • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the south east of the site. • All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. esb substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; • This development will form part of a larger/future phase of the development; • No changes to the existing pumping station located outside the northern site boundary; A Natura Impact Statement has been prepared in respect of this application.
22340 Decision Due Date: 04/02/2023	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area(c. 595 sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a sections of the distributor road permitted under WMCC Reg. Refs 14/7103 ABP Ref. PL25.244826

Planning Ref No.	Applicant Name	Summary of Development
		and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated ESB substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

Excavated soil and bedrock from the Proposed Development Site could potentially be directed to the same receiving waste facilities for recovery/ disposal as excavated soil and stone from other developments outlined in Table 6-8 and within the wider Westmeath area. All surplus soil and stone from the Proposed Development Site will be removed off-site in accordance with the requirements of the RWMP (AWN, 2023b) and all statutory legislation, Surplus material to be removed off-site will be directed to appropriately permitted/licensed waste facilities operated in compliance with the relevant statutory consents for the facility. Accordingly, it is considered that any cumulative impact on the land, soils, geology associated with the Proposed Development will be 'neutral', 'imperceptible' and 'permanent'.

There are no cumulative impacts on land, soil or geology associated with the Construction Phase and Operational Phase of the Proposed Development.

6.5.4 "Do Nothing" Impact

In the 'Do Nothing' scenario, the potential impact on the receiving land, soils and geological environment if the Proposed Development did not proceed. It is considered that there would be no change or resulting impact on the nature of the Proposed Development Site which would remain as undeveloped land and there would be no impact or change to the land, soil and geology of the Proposed Development Site.

6.6 Avoidance, Remedial & Mitigation Measures

The mitigation measures as outlined below, will ensure that there will be no significant impact on the receiving land, soil and geology.

6.6.1 Construction Phase

A Construction Environmental Management Plan (CEMP) (EOBMS, 2023d) and Resource & Waste Management Plan (RWMP) (AWN, 2022b) have been prepared for the Proposed Development as part of the planning application. The appointed contractor will further develop the CEMP and RWMP to ensure site specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the projects and prevent any potential emissions to ground having regard to relevant industry standards (e.g., Guide for Consultants and Contractors, CIRIA -C532', CIRIA, 2001).

The CEMP (EOBMS, 2023d) provides detailed construction phasing and methods to manage and prevent any potential emissions to ground having regard to relevant industry standards.

The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development.

Detailed design will be specified by an appropriately qualified geotechnical Engineer for the construction of foundation at the Site to ensure that ground conditions are engineered and controlled appropriately.

Mitigation measures specific to land, soil and geology that the appointed contractor will incorporate into the CEMP and RWMP are outlined in the following sections.

Import of Aggregates

Contract and procurement procedures will ensure that all imported aggregates required for the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates shall be subject to management and control procedures which shall include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

Management of Stockpiles (soil and other materials/ waste)

For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area shall be identified and designated.
- All stockpiles shall be assigned a stockpile number.
- Material identified for reuse onsite, offsite and waste materials will be individually segregated; and all segregation, storage & stockpiling locations will be clearly delineated on the Site drawings.
- Soil stockpiles will be sealed to prevent run-off from the stockpiled material generation and/or the generation of dust.
- Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross-contamination of the soil below or cross contamination with soil.
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust; and
- Stockpiles will not be located near Site boundaries or sensitive receptors and a set-back of 50m will be maintained from watercourses.

When a stockpile has been sampled for classification purposes, it shall be considered to be complete, and no more soil shall be added to that stockpile prior to removal off Site. An excavation/stockpile register shall be maintained on-site

Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be stored on-site in such a manner as to:

- Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour control measures, as may be required);
- Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery; and
- Prevent hazards to site workers and the general public during construction phase (largely noise, vibration and dust).

Reuse of Soils Onsite

The reuse of excavated soil for the Proposed Development will be subject to assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

Control and Management of Dust

Handling of soils will be undertaken in accordance with documented procures that will be set out in order to protect ground and minimise airborne dust. The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. Specific measures as outlined in the CEMP includes :

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the Site and along the main transport routes to the Site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of Soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph; Daily inspection of construction sites to examine dust measures and their effectiveness.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the Site will pass through a wheel cleansing area prior to entering the local road network.

Concrete Works

Where possible precast concrete will be used for culverts and concrete works. However, where cast-in-place concrete is required (i.e., foundations, footpaths), all work will be carried out to avoid any contamination of the receiving soil and geological environment through the use of appropriate design and methods implemented by the Contractor and in accordance with industry standards.

All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. Concrete mixer trucks will not be permitted to wash out on-site with the exception of cleaning the chute into a container which will then be emptied into a skip for appropriate compliant removal offsite.

The following mitigation measures are outlined in the CEMP (EOBMS, 2023d) to avoid release of cement leachate to the Site:

- All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. There will be no batching of wet-cement products on Site.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

The piling methodology (specified at detailed design stage) where required, will minimise the potential for the introduction of any temporary conduit between any potential source of contamination at the ground surface and underlying soils, subsoils and bedrock. The piling method will include procedures to ensure any potential impact to underlying ground is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

Handling of Chemicals and Fuels

Fuel, oils and chemicals used during construction are classified as hazardous. All fuels/soil and all storage tanks and draw-off points will be located in a dedicated, bunded and secure area of the Site (AWN, 2022b). Only dedicated trained and competent personal will carry out refuelling operations (EOBMS, 2023d). Each station will be fully contained equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works onsite.

The CEMP (EOBMS, 2022d) outlines fuel and oil control procedures which will be implemented during the Construction of the Proposed Development including:

- All plant and machinery will be serviced before being mobilized to Site.
- No refueling of machinery or overnight parking of machinery is permitted in areas adjacent to watercourses or on-site drainage infrastructure.

- Fuel volumes stored on site should be minimised. There will be no bulk storage of fuels.
- On-site refueling will only take place at distances greater than 50 meters from nearest water courses or Site drainage infrastructure. Refulling will take place by direct filling from a delivery truck or using a mobile double skinned fuel bower. The fuel will re-filled off site and will towed around the site as required.
- On-site refueling of machinery will be carried out using an oil company vehicle sourced from a local supplier.
- Only dedicated trained and competent personnel will carry out refueling operations.
- A spill kit and drip tray shall be on Site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling.
- Spill kits shall be available in each item of plant required.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.

The plant refueling procedures described above shall be detailed in the contractor's method statements (EOBMS, 2023d).

Any required quality of fuels and chemicals will be stored in bunded storage tanks. Bunds will have regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013) and Enterprise Ireland. Best Practice Guide BPGCS005. Oil Storage Guidelines. All tank and drum storage areas will, 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.

Only emergency maintenance will be carried out on Site.

Emergency Procedures

Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.

Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.

In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with current industry best practice procedures and EPA guidelines.

Site staff will be familiar with emergency procedures in the event of accidental fuel spillages and all staff on-site will be fully trained on the use of equipment to be used on-site.

The emergency procedures set out in the CEMP will be implemented and further developed by the appointed Contractor in advance of the works commencing.

Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Temporary port-a-loo toilets will be used during construction. The facilities will require periodic waste pumping and waste haulage offsite. Wastewater will be tankered off-site by permitted waste collector to wastewater treatment plant. The removal and disposal of wastewater from Site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007 (EOBMS, 2023d). All waste from welfare facilities will be managed in accordance with the relevant statutory obligations. Removal of waste offsite will be by an appropriately authorised contractor in compliance with all legislative requirements.

Geotechnical Design

Appropriate geotechnical design avoidance and reductive measures will be incorporate in the design to prevent any potential impacts associated with the soil on Site, such measures as set out in the geotechnical report include (but are not limited to):

- Trench fill to extend to depth ranging from 1 to 1.9m below existing levels to reach suitable bearing stratum.
- Removal or soft/ very loose soil and unsuitable ground and resulting voids backfilled with Grade ST1 concrete.
- Recommendation that there is a suspension on excavation, if ground conditions vary significant from those identified in the boreholes during the ground investigation.

The specific type of ground improvement and structural design will be determined at the detailed design stage. The detailed design will be specified by an appropriately qualified geotechnical Engineer for the construction of Proposed Development Site to ensure that ground conditions are engineered and controlled appropriately.

The Site is identified as not being located within a High Radon Area however, as a high radon level can be found in any area, in any part of the country, standard design measures including appropriate radon membranes will be incorporated into the design of buildings in accordance with relevant Building Regulations.

The Site Investigation Report did not reference any issues associated with pyrite. All aggregates imported to the Site for use in the Proposed Development will be subject to strict quality control procedures in accordance with the design specification and relevant Building Regulations therefore avoiding any potential issues with pyrite in aggregates

Export of Soil and Stone Material

There is no removal offsite required for the design of the Proposed Development however if require the removal offsite of surplus soil and stone from the Proposed Development will be reused as a by-product under Article 27 by-product notification or sent for recovery at a suitable authorised facility in accordance the Waste Management Act 1996 -2011 as amended and associated regulations and guidance. It will be the contractor's responsibility to engage a specialist waste service contractor (s) who will possess the requisite authorisations, for the collection and movement of by-product / waste materials offsite. Material will be brought to an

authorised facility which currently holds an appropriate waste facility permit or licence for the specified waste types. Waste Permitting, Licences & Documentation: under the Waste Management (Collection Permit) Regulations 2007, as amended, a collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO), must be held by each waste collection contractor.

Sampling and waste classification assessment soil to excavated will be undertaken in advance removal of any material off-site to ensure that the management and removal of soils off-site will be undertaken in accordance with the Waste Management Act 1996 -2011 as amended and associated regulations and guidance

All surplus materials and any waste will be removed off-site in accordance with the requirements outlined in the RWMP (AWN, 2022) and will be managed in accordance with all legal obligations.

6.6.2 Operational Phase

There are no mitigation measures specifically required in relation to Land Soil and Geology for the Operational Phase.

6.6.3 "Worst Case" Scenario

During the Construction Phase or Operational Phases, there is a potential risk of accidental release of petroleum hydrocarbons (e.g. a fuel spill) that could migrate to underlying soil, subsoils or geology. This could result in a 'negative' 'significant' and 'long term' impact on the receiving environment depending on the nature of the incident. However, taking account of the avoidance and mitigation measures the worst-case scenario is deemed to be an unlikely scenario.

6.7 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

The predicted impacts of the Construction and Operational Phases are described in in terms of quality, significance, extent, likelihood and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Table 6-9 Summary of residual land and soil effects

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Construction of the Proposed Development	Land take	The Proposed Site will develop land for residential use, resulting in a change in land from predominately greenfield to residential and open space.	Negative	Significant	Permanent	Direct	Unavoidable and no mitigation. The Proposed Development is in line with the Athlone Town Development Plan (WCC, 2014) within the zoning of residential and mixed use.	Significant
Accidental release of deleterious materials including fuel , cement and other materials being used onsite.	Soil & Geology	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used on-site, through the failure of secondary and tertiary containment or a materials handling accident, to the soil and geological environment.	Negative	Moderate	Long Term	Direct	All fuels and storage tanks will be located in dedicated bunded and secure areas on Site. Site staff will be trained in appropriate refuelling. Emergency response procedures will be put in place, in the unlikely event of spillage of fuels. The removal and disposal of wastewater from Site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007 The cementitious materials used during construction will avoid any contamination of soil and geology through the use of appropriate design and methods implemented by the appointed Contractor and in accordance with industry standards.	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Excavation of Soils & Subsoils	Soil Structure	Stockpiling of soil and subsoil pending reuse on-site will result in the exposure of the materials to various elements including weather and construction traffic.	Negative	Slight	Long Term	Direct	Soil and subsoil pending re-use will be stockpiled in a controlled mapper and in accordance with the requirements of the CEMP (EOBMS, 2023d) which will be developed by the appointed contractor.	Slight
Removal of Material Offsite	Receiving Facility	It is anticipated that all all-excavated material will be used onsite (pending suitability assessment). Where excess material is generated, it will be exported offsite.	Neutral	Negligible	Permanent	Indirect	Receiving waste facility will be appropriately licenced/permitted to accept surplus soil and stone. Conditions for material for Article 27 are set out by the EPA to ensure material is suitable for re-use at receiving facility.	Imperceptible
Importation of aggregates	Land, Soil and Geology	The potential impacts may include importation of unsuitable contaminated materials.	Negative	Moderate to Significant	Long Term	Indirect	Contract and procurement procedures will ensure that all imported aggregates meet with industry conformity/compliance standards and statutory obligations	Imperceptible
Operational Phase								
Failure of SuDs	Land, Soils and Geology	There is a risk to soil quality due to failure of SuDs resulting in release of contaminates to ground surface.	Negative	Moderate	Long Term	Direct	Ongoing regular operational monitoring and maintenance of SuDs measures will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development.	Imperceptible

6.8 Monitoring

6.8.1 Construction Phase

During the Construction Phase of the Proposed Development the following monitoring measures will be implemented:

- Routine monitoring and inspection during refuelling and concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soil onsite and for removal offsite
    - Record keeping
    - Traceability of all materials, surplus soil and other waste removed from the Proposed Development Site: and
    - Ensure records are maintained of materials accepted at the end destination
- Stockpiles will be inspected daily by the appointed contractor to ensure materials are segregated on-site for the appropriate waste stream and disposal destination and to ensure there is runoff from the stockpiled materials and/or generation of dust.

Imported material will be subject to assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

Sampling and waste classification assessment of potentially contaminated soil to be excavated will be undertaken in advance removal of any material off-site to ensure that the management and removal of soils off-site will be undertaken in accordance with the Waste Management Act 1996 -2011 as amended and associated regulations and guidance.

6.8.2 Operational Phase

Ongoing regular operational monitoring of the SuDs measure will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development.

6.9 Interactions

6.9.2 Population and Human Health

The Proposed Development is not considered to be within a High Radon Area and where required radon barriers will be installed in accordance with current building regulations.

The potential for ingress of ground gases including radon or gases associated with organic content of soil will be addressed through standard building design measures including the installation of appropriate membranes.

Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase that will be protective of Site workers.

The necessary measures will also be implemented to address any nuisance issues associated with dust dispersion during construction works including the offsite removal of surplus soil. The potential impacts associated with airborne dust is addressed in Chapter 8 (Air Quality) and Chapter 4 (Population and Human Health) of this EIAR. Specific issues relating to Public Heath associated with the Proposed Development are set out in Chapter 4 of this EIAR.

6.9.2 Hydrology

An assessment of the potential impact of the Proposed Development on the hydrological environment is included in Chapter 7 of this EIAR. Procedures for the protection of receiving surface water environment are set out in Chapter 7 of this EIAR.

6.9.3 Material Assets – Waste and Traffic

The Proposed Development will include the removal offsite of surplus soils and stone for reuse/recovery/disposal. An assessment of the potential impact of the Proposed Development on the material assets including built services, infrastructure ad waste management is included in Chapter 12 of this EIAR.

6.9.4 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Proposed Development Site, with emphasis on habitats, flora and fauna which may be impacted as a result of the Proposed Development are included in Chapter 5 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

6.9.5 Landscape and Visual

During the construction phase the Site landscape will undergo a change from predominately greenfield lands to residential with landscaping. An assessment of the potential impact of the Proposed Development on the receiving land scape is included in Chapter 10 of this EIAR.

6.9.6 Air Quality and Climate

The excavation of soils across the Proposed Development Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust). An assessment of the potential impact of the Proposed Development on air quality and climate are included in Chapter 8 of this EIAR.

6.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter of the EIAR.

6.11 References

Athlone Town Council, 2004. Cornamaddy Action Area Plan – 2005.

AWN Consulting (2022) Operational Waste Management Plan for the Proposed Development at Ballykeeran Gardens, Cornamaddy, Athlone, Co. Westmeath (AWN, 2022a)

AWN Consulting (2022) Resource & Waste Management Plan for A Proposed Residential Development at Ballykeeran Gardens, Cornamaddy, Athlone, Co. Westmeath (AWN, 2022b)

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Environmental Protection Agency, 2020. Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities.

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EOB Management Services, Engineering Consulting (2023). Planning Application Services Report – In respect of Lands at Cornamaddy & Ballykeeran Athlone (EOBMS, 2023b)

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Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide. Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

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Westmeath County Council (2014) Athlone Town Development Plan (2014-2020) Volume 2 Book of Maps (WCC, 2014)

7 HYDROLOGY

7.1 Introduction

This chapter provides a description of the hydrology and hydrogeology (water) environment within and immediately surrounding the Site of the Proposed Development and an assessment of the potential impacts of the Proposed Development on hydrology and hydrogeology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Hydrological and hydrogeological characteristics of the receiving environment at the Proposed Development Site.
- Potential impacts that the Proposed Development may have on the receiving water environment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development; and
- Evaluate the significance of any residual impacts.

7.1.1 Quality Assurance and Competence

This chapter of the EIAR was written by Sam Marchant MSc., BSc, who is a Hydrogeologist with Enviroguide Consulting experienced in hydrogeological and geological impact assessments. The chapter is reviewed by Claire Clifford BSc., MSc., PGeo., EurGeol who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide Consulting and is a Professional Geologist with the Institute of Geologists of Ireland and has extensive experience in preparing environmental assessments for a range of project types and geological and hydrogeological Site settings.

7.1.2 Description of the Proposed Development

The Applicant intends to apply to Westmeath County Council for a 10-year permission for a Large-scale Residential development. Chapter 02 Description of the Proposed Development describes the Proposed Development. Figure 7-1 shows the layout of the Proposed Development.

Figure 7-1: Proposed Site Masterplan (Refer to Architecture Drawing, Proposed Site Masterplan 100 (Arnold Leahy Architects, February 2023))

7.2 Study Methodology

7.2.1 Regulation and Guidelines

The methodology adopted for the assessment has regard to the relevant guidelines and legislation including:

- Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC (Water Framework Directive, WFD).
- European Commission, 2023. WFD Reporting Guidance 2022. Final Draft V6.

- Local Government, October 2021. No. 1.1977. Local Government (Water Pollution (Amendment) Act.
- Local Government, October 2007. No. 30.2007. Water Services Act 2007.
- Local Government, July 1990. No. 21.1990. Local Government (Water Pollution) (Amendment) Act, 1990.
- Local Government, March 1977. No. 01/1977. Local Government (Water Pollution) Act, 1977 with amendments.
- S.I. No. 722/2003 – European Communities (Water Policy) with amendment S.I. No. 413/2005.
- S.I. No. 489/2011 – European communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011.
- S.I. No. 122/2010 – European Communities (Assessment and Management of flood Risks) Regulations 2010 including amendment S.I. No. 495/2015.
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019.
- S.I. No. 9 of 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 including amendments S.I. No. 149 of 2012 and S.I. No. 366 of 2016; and
- WFD Working Group, 2005. Guidance on the Assessment of the Impact of Ground-water Abstractions (WFD, 2005).

Other guidance used in the assessment of potential impacts on the receiving water environment are referenced where relevant in this EIAR Chapter and includes

- Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites (CIRIA – C532).
- Construction Industry Research and Information Association, 2015. Environmental Good Practice on Site Guide (CIRIA – C741).
- Construction Industry Research and Information Association, 2016. Groundwater control: design and practice (CIRIA – C750).
- Department of the Environment, Heritage and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999. Groundwater Protection Schemes (DEHLG/EPA/GSI, 1999).
- Department of the Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, 2009).
- Department of Housing, Planning and Local Government, August 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018).

- Environmental Protection Agency, 2014. Guidance on the Authorisation of Direct Discharges to Groundwater.
- Environmental Protection Agency, 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.
- Environmental Protection Agency, 2013. Storage and Transfer of Materials for Scheduled Activities.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Environmental Protection Agency, 2002. Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002).
- Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003).
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009); and
- WFD Working Group, 2005. Guidance on the Assessment of the Impact of Groundwater Abstractions (WFD, 2005).

7.2.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An initial Assessment and Impact Determination stage was carried out by Enviroguide Consulting to establish the project location, type and scale of the Proposed Development, the baseline conditions, and the type of hydrological and hydrogeological environment, to establish the activities associated with the Proposed Development and to undertake an initial assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Proposed Development Site and receiving environment.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Proposed Development Site. The study area, for the purposes of assessing the baseline conditions for the Hydrology and Hydrogeology Chapter of the EIAR, extends beyond the Site boundaries and includes receptors that may be potentially hydraulically connected to the Proposed Development Site. Those outside of this radius but that are potentially hydraulically connected with the Site were also considered. The extent of the wider study area was based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013) that recommends a minimum distance of 2.0km radius from the Proposed Development Site. The purpose of this increased search radius was to ensure that any potential hydrogeological / hydrological connections to sensitive receptors including habitats were identified.

The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area including published information and details pertaining to the Proposed Development provided by the Applicant and design team.

A Site walkover survey to establish the environmental Site setting and baseline conditions at the Proposed Development Site relevant to the hydrological and hydrogeological environment was undertaken by Enviroguide Consulting on the 28th of September 2022.

The Element 1 stage of the assessment was completed by Enviroguide Consulting and included the review of the following sources of information:

- Environmental Protection Agency (EPA) web mapping (EPA, 2023).
- Geological Survey Ireland (GSI) Datasets Public Viewer and Groundwater web mapping (EPA, 2023).
- National Parks and Wildlife Services (NPWS) web mapping (NPWS, 2023).
- Ordnance Survey Ireland (OSI) web mapping (OSI, 2023).
- Water Framework Directive Ireland (WFD) web mapping (WFD, 2023).
- Teagasc web mapping (Teagasc, 2023); and
- Information provided by the Applicant pertaining to previous Site investigations and the design proposals for the Proposed Development. Including a ground investigation report by Stratex Site Investigation & Geotechnical Engineers (Stratex, 2022).

Element 2: Involves Direct and Indirect Site Investigation and Studies stage where necessary to refine the CSM and evaluate the potential impacts associated with the Proposed Development. It was determined by professional judgement that in accordance best practice guidance and standards there was adequate site-specific scientific data available for the assessment including Site specific ground investigation data.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered in relation to the Construction and Phase and Operational Phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Hydrology and Hydrogeology sections of the EIAR in this Chapter which includes all the associated figures and documents.

7.2.3 Description of Importance of the Receiving Environment

The National Roads Authority (NRA) criteria for estimation of the importance of hydrogeological features at the Proposed Development Site during the Environmental Impact Assessment (EIA) stage, as documented by IGI (IGI, 2013) are summarised in Table 7-1.

Table 7-1: Criteria for Rating Site Importance of Hydrogeological Features

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by European Union (EU) legislation e.g., SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland, or surface water body. ecosystem protected by national legislation – e.g., NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater 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.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality. or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

7.2.4 Description and Assessment of Potential Impacts

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter are described in Table 7-2.

Table 7-2. Assessment of Potential Impacts Terminology and Methodology

Quality of Effects / Impacts	Definition
Positive	A change that improves the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment.
Significance of Effects / Impacts	**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 a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Extend and Context of Effects	
Extend	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe weather the extent, duration or frequency will conform or contrast with established (baseline) conditions
Probability of Effects	
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	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
Reversible	Effects that can be undone, for example through remediation or restoration
Types of Effects	
Indirect Effects	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	he addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
"Do-nothing" Effects	The environment as it would be in the future should the subject project not be carried out
"Worst-case" Effects	he effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents

7.3 The Existing and Receiving Environment (Baseline Situation)

7.3.1 Site Location and Description

The Site of the Proposed Development is located in Cornamaddy and Ballykeeran, Athlone Co. Westmeath. The Site lies to the northwest of the N55 roads. The Site is currently greenfield with surrounding land use comprises of residential, commercial, and civic land use. The BMW Athlone commercial development is located to the east of the Proposed Development. Resident properties and greenfield lands are located to the south of the Site. The west of the

Site is currently undeveloped lands (subject to a current planning application). The north of the Site is bound by an unnamed local road with residential developments.

The Proposed Development Site location is presented in Figure 7-2.

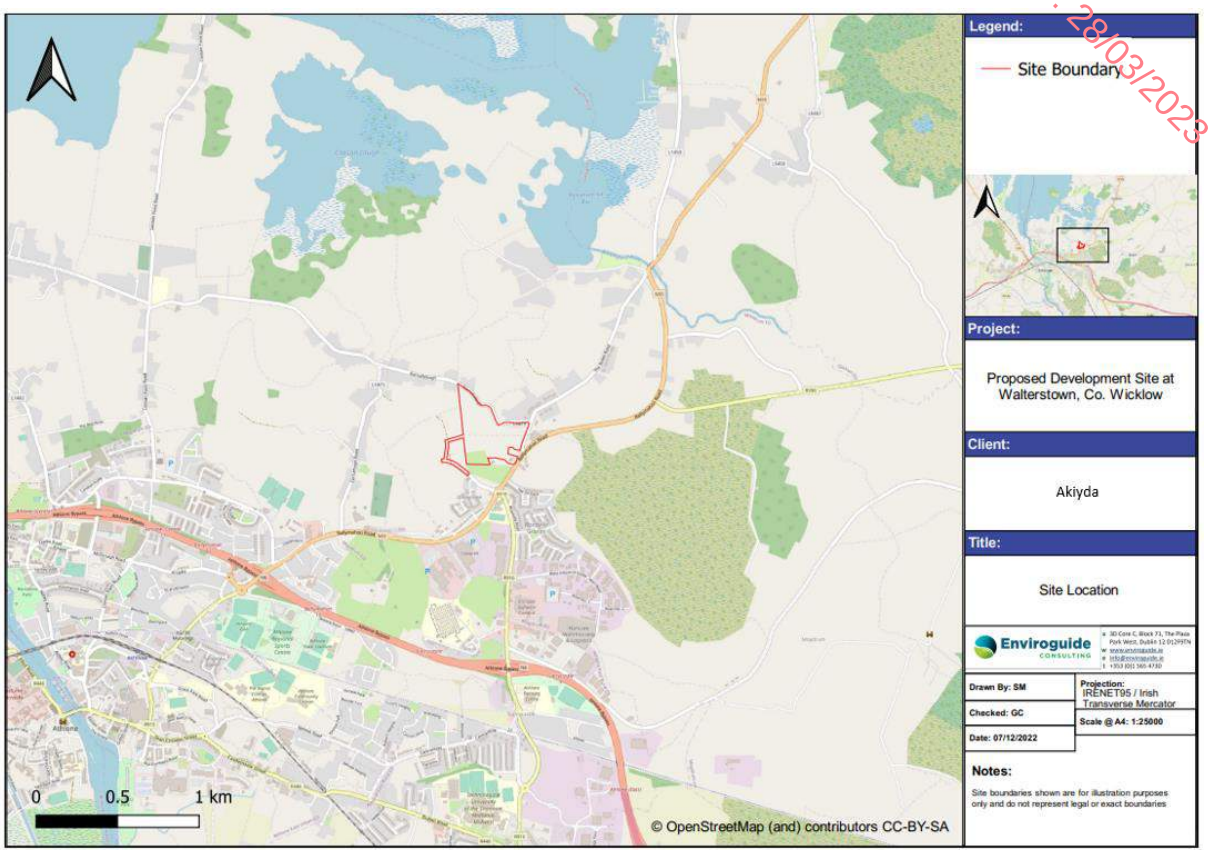

Figure 7-2: Site Location Map

7.3.2 Topography

The topographical survey of the Proposed Development Site indicates that the overall topography ranges from approximately 48.75m above ordnance datum (mOD) in the southwest to approximately 39.65 mOD to the central west of the Site. In general, the Site is gently sloping towards the west (refer to Figure 7-3).

- The topographic high of 48.75m is associated with a mound contained within a brick wall to the south-east of the Site. The mound likely comprises demolished materials from a building which was present on Site up to 2007. A review of the historical land use indicated a building was presence from the 1995 aerial photograph to the southeast of the Site, in 2005 the roof was removed and by the 2007 aerial photograph, the building was demolished, and a mound of material was present in the former location.
- There is a small hill to a maximum height of 43.46m in the northern centre of the Site.
- The Garrynafela stream (which is part of Shannon (Upper)_110 river) is located in the centre of the Site. The stream flows from east to west and changes to a northly direction at the western boundary of the Site. The invert level of the river is 38.1mOD in as it leaves the Site.

- Additional drainage channels (not defined by the EPA as WFD waterbodies) are noted on Site running from east to west, joining the south-north drainage channel running along the western boundary of the Site.
- Two rock outcrops are mapped in the centre field of the Proposed Development. These were noted as vegetated areas with boulders during the Site walkover, manmade materials were also present (plastic sheeting). These outcrops are not indicated on the historical maps and first appear on the aerial photographs in 2004 (OSI, 2022), suggesting the boulders were placed here and not bedrock outcrops. The outcrops are not mapped by the GSI (GSI, 2023).

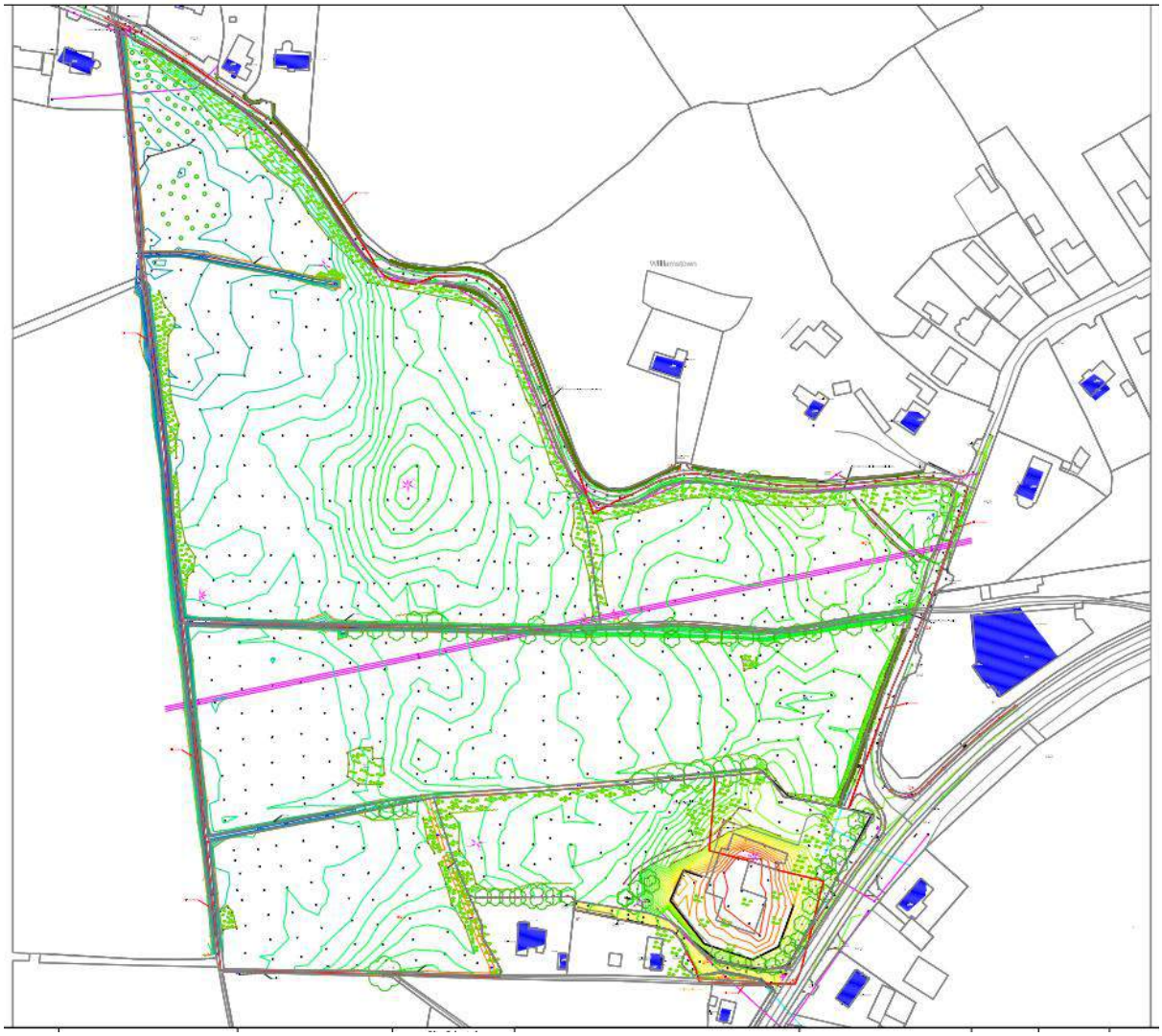

Figure 7-3: Topographic Map (Refer to Drawing 2020-P302-100, Rocktop (2022) refer to Appendix G)

7.3.3 Rainfall

Monthly rainfall data available for 1km x 1km grids (for the period 1981 to 2010) was sourced from Met Éireann (Walsh, 2012) and is presented in Table 7-3.

Table 7-3: Long Term Mean Monthly Rainfall Data (mm) (Walsh, 2012)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
90	68	73	56	60	71	67	84	73	96	87	90	916
Note: 1km x 1km Irish Grid Coordinates selected for the Site = X (Easting): 206000, Y (Northing): 243000												

The closest the synoptic meteorological station to the Proposed Development Site, Mt Dillion, is located approximately 29.5km north of the Proposed Development Site. A summary of the average PE at Mt Dillion station for the period 2019 to 2022 (Met Éireann, 2023) is presented in Table 7-4.

Table 7-4: Average Potential Evapotranspiration (Met Éireann, 2022)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
9.0	18.1	33.7	57.0	78.8	76.9	81.8	67.7	41.8	23.7	10.3	7.1	505.6

The GSI (GSI, 2022) have calculated an Effective Rainfall (ER) value of between 475mm/year and 502mm/year across the Proposed Development Site.

7.3.4 Soil, Quaternary, Geology

The soils on the Site are mapped as ‘Fen Peat’ to the west and ‘shallow well drained mineral soils (mainly basic)’ to the east (GSI, 2023). The subsoils beneath the Site are ‘Fen Peat’ to the west and ‘gravels derived from limestone’ to the east.

The bedrock underlying the Site is ‘Waulsortian’ limestone (GSI, 2022). The soils and geology are further assessed in Chapter 6. There are no karst features on the Site boundary or within a 2km radius of the Site.

7.3.5 Regional Hydrogeology

7.3.5.1 Recharge

The GSI groundwater recharge map provides an estimate of the average amount of rainwater that percolates down through the subsoils to the water table over a year. The map accounts for rainfall that percolates diffusely through soils and subsoils it does not consider water that enters aquifers at points (e.g., at sinkholes) or along linear features (e.g., along sinking streams/rivers). Groundwater recharge amounts are estimated by considering soil drainage, subsoil permeability, thickness and type, the ability of the aquifer to accept the recharge, and rainfall. The recharge to the aquifer from the gravels on Site (to the east) is estimated as 427 mm/yr, while the recharge to the in the aquifer from the fen peat is estimated as 19 mm/yr (to the west of the Site)(GSI, 2023).

7.3.5.2 Aquifer

The GSI map a gravel aquifer beneath the Site classified by as ‘Locally important gravel aquifer’ (Aquifer Code: Lg). The gravel aquifer has a delineated area of 28.11km^2 (GSI, 2022). The gravel aquifer map is present in Figure 7-4 below.

The underlying, bedrock aquifer within the Waulsortian Limestone beneath the Site is classified by the GSI (2022) as a 'Locally Important Aquifer – Bedrock' (Aquifer Code: LI) which is Moderately Productive only in Local Zones'. The bedrock aquifer map is presented in Figure 7-5 below.

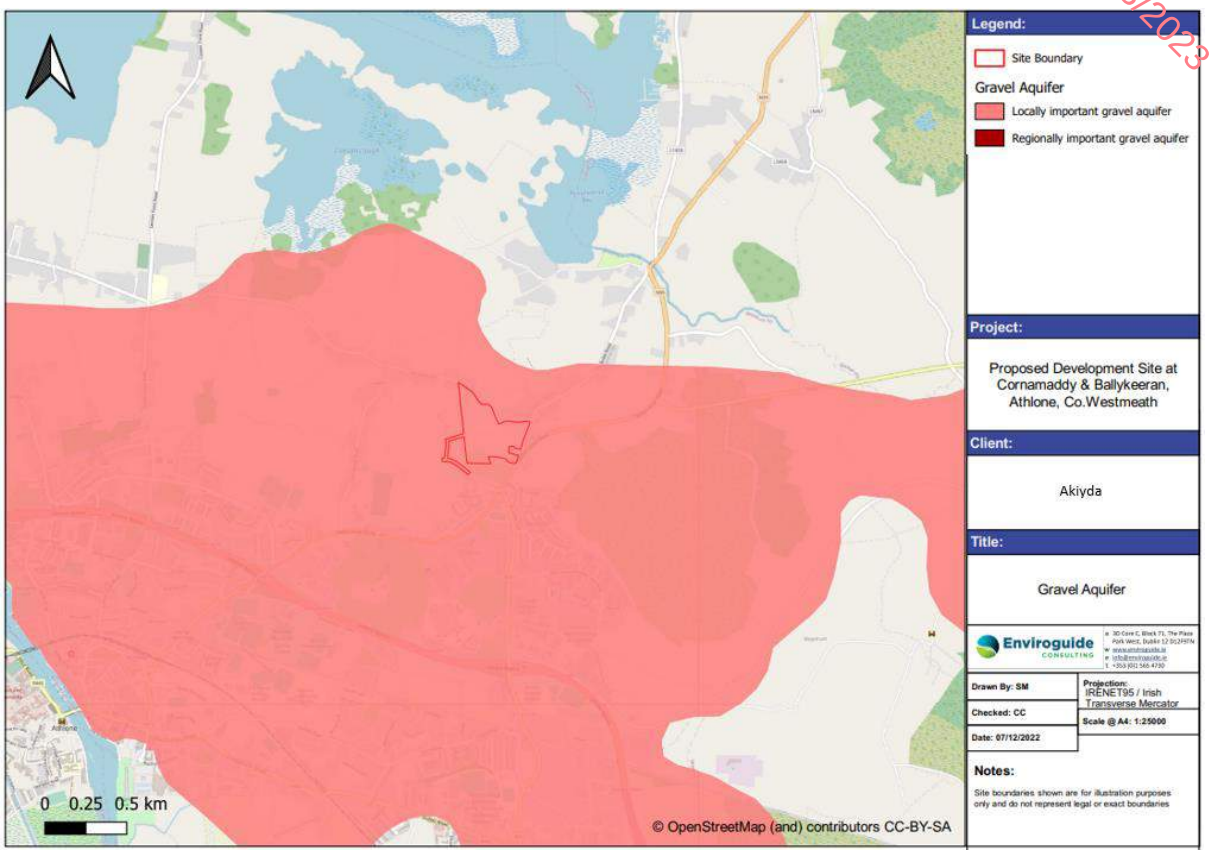

Figure 7-4: Gravel Aquifer Map

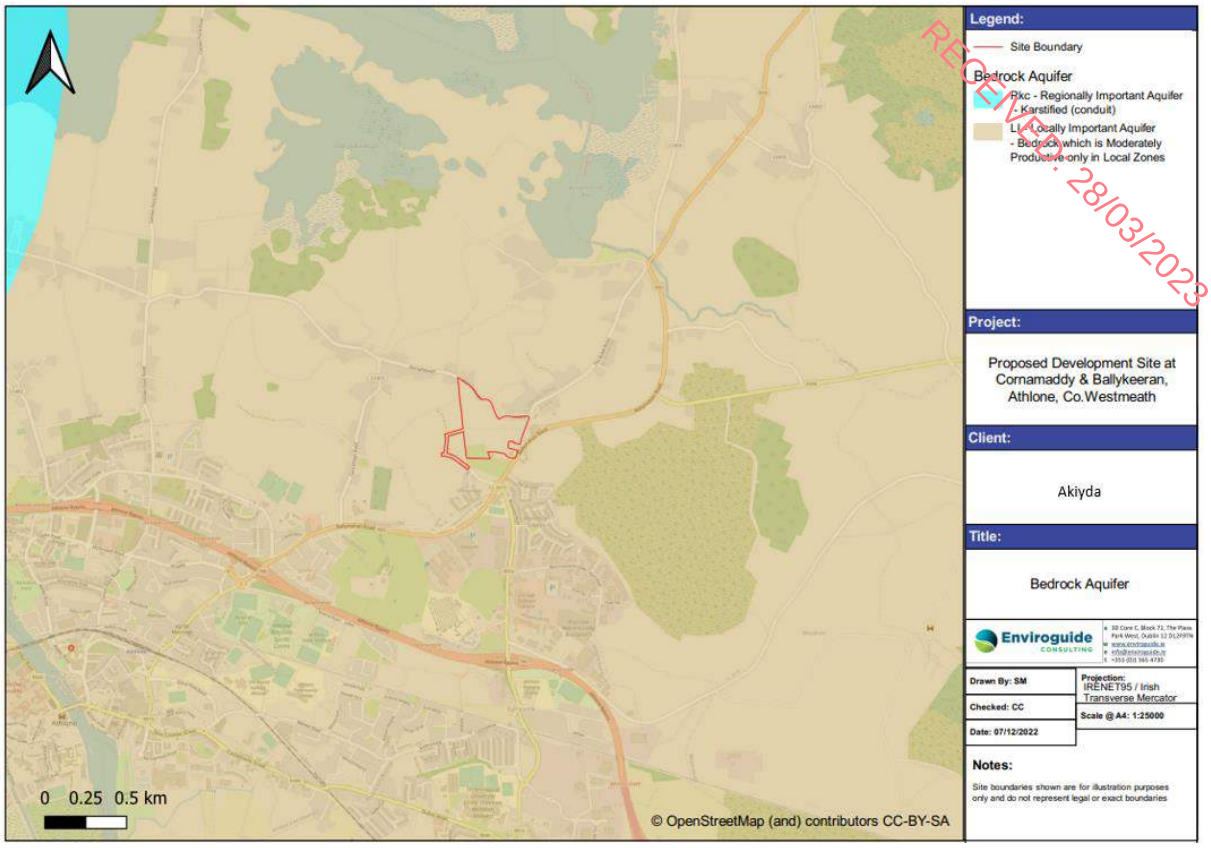

Figure 7-5: GSI Bedrock Aquifer Map

7.3.5.3 Groundwater Body

The EPA (EPA, 2023) maps the groundwater body beneath the Site as the Athlone Gravels (EU Code: IE_SH_G_246). There is no GSI groundwater descriptor report available for this groundwater body (GSI, 2023). The gravels on Site are overlying the Waulsortian 'Locally Important Aquifer'. The Waulsortian limestones are part of the Inny groundwater body (EU Code: IE_SH_G_110) (GSI, 2023).

The Inny groundwater body comprises a large area of 1,384 km^2. Diffuse recharge will occur over the entire Inny groundwater body (GWB) via rainfall infiltration to bedrock, the depth to bedrock ranges between at ground surface and 20m below ground (GSI, 2023). The GSI groundwater body descriptor notes that the main discharge mechanisms of the Inny GWB will be local, including discharges to the River Inny and its tributaries crossing the groundwater body as well as to the Lough Ree to the southwest (GSI, 2023). Groundwater flow will be of a local nature (generally between 30 and 300m), concentrated in fractured and weathered zones and in vicinity of fault zones. The river Inny is located approximately 10.8m northeast of the Site at the closet point, thus based on the short flow pathways, and the locations of the lakes, the groundwater in vicinity of the Site is likely to flow and discharge towards Ballaghkeeran lake waterbody (LWB) to the north of the Site and Coosan LWB to the northeast (which eventually discharge to the Ree LWB).

7.3.5.4 Aquifer Classification and Groundwater Vulnerability

The vulnerability rating, and methods for determination, are presented in the Groundwater Protection Schemes publication (DEHLG/EPA/GSI, 1999) and summarised in Table 7-5. The publications state that '*as all groundwater is hydrologically connected to the land surface, it is*

the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area:

- *the subsoils that overlie the groundwater.*
- *the type of recharge - whether point or diffuse; and*
- *the thickness of the unsaturated zone through which the contaminant moves*.

Table 7-5: Vulnerability Mapping Criteria (DEHLG/EPA/GSI, 1999)

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point Recharge	Unsaturated Zone
	Subsoil Permeability & Type			(Swallow holes, losing streams)	(sand & gravel aquifers *only*)
	High permeability (sand & gravel)	Moderate permeability (sandy subsoil)	Low permeability (clayey subsoil, clay, peat)		
0-3m	Extreme	Extreme	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High

Notes: (i) N/A = not applicable (ii) Permeability classifications relate to the material characteristics as described by the subsoil description and classification method.

The GSI has assigned a groundwater vulnerability rating of 'Moderate' (M) to "High" (H) for the groundwater beneath the Site (GSI, 2023).The groundwater vulnerability rating maps are provided in Figure 7-6.

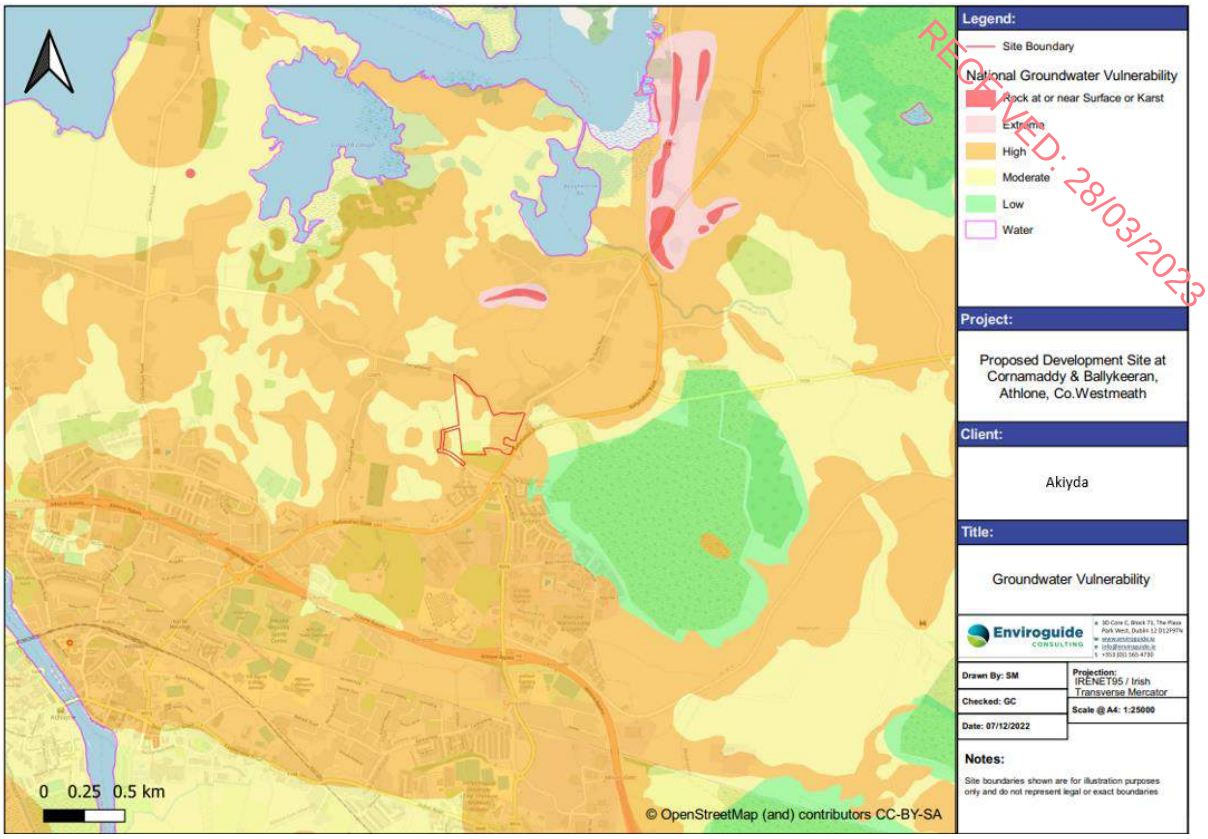

Figure 7-6: GSI Vulnerability Map

7.3.6 Site Hydrogeology

A geotechnical investigation of the Proposed Development was undertaken by Stratex Site Investigation and Geotechnical Engineers (Appendix F). The soil conditions encountered on Site are described in Chapter 6.

Groundwater strikes were encountered in the following locations at the following depths:

- TP1 at 1.3mbgl in Gravel
- TP4 at 1.6mbgl in Gravel
- TP9 at 2.7mbgl in Sand

Installations were installed in the three boreholes and groundwater levels were noted in BH1 and BH3 post drilling at 1.3 and 1.6mbgl respectively. The wells were drilled in July 2022, seasonality is likely to occur in the groundwater levels beneath the Site.

7.3.7 Hydrology

The Site is located within the Shannon (Upper)_SC_090 WFD Sub-catchment and within the Upper Shannon (Code: 26E) WFD Catchment. The EPA waterbodies within a 2km radius are shown in Figure 7-7 below.

- The Garrynafela stream (EPA Segment Code: 26 1675) flows through the Site in an east to west direction, before being routed to the North along the western boundary of the Site. The EPA website maps the stream as commencing at the eastern boundary of the Site. Local information indicates that the stream crosses the L5479 road (along the eastern boundary of the Site) and may take runoff from the existing garage

adjoining the Site (EOBMS, 2023c). However, the majority of the runoff to the stream is within Site.

- The Garrynafela stream is within the Shannon Upper_110 WFD catchment (EU Code: IE_SH_26S021660). The Shannon (Upper)_110 sub-basin covers large area (258 km^2, EPA, 2022) and contains numerous streams discharging into the Lough Ree lakes.
- The Garrynafela stream flows north into Ballaghkeeran Lake (EU Code: IE_SH_26_750d).
- The Breensford (Breenford_020 , EU Code: IE_SH_26B100400) is located approximately 1.3km to the northeast of the Site and also discharges to the Ballaghkeeran Lake.
- The Ballaghkeeran Lake discharges into the Killinure Lake (EU Code: IE_SH_26_750b).
- The Killinure lake discharges to the Ree Lake (EU Code: IE_SH_26_750a). The Ree Lake covers an area in 100km^2).
- The Killinure lake discharges to the Shannon (Upper) River (at Shannon (Upper)_120, EU Code: IE_SH-26S021800)
- The water flow is tracked downstream through the Shannon (Upper) and the Shannon (Lower) (the distance of each of the Shannon River segments is shown in Table 7.7 in Section 7.3.9 below) before eventually reaching Limerick Dock transitional water (located over 95km from the Site). The river passes through the Derg lake waterbodies (EU Code: IE_SH_25_191 and IE_SH_25_191b).
- The Inny River (which is indicated as a discharge point for the Inny GW body which underlies the Site (GSI, 2023)) is located over 10km northeast of the Proposed Development Site and is not hydraulically connected to the Site.

The EOB management services report on the Garrynafela stream (referred to as the Ballykernan stream, EOBMS, 2023c) notes that the stream depth and width has developed overtime to accommodate the traditional activities on the land, with agricultural activities dictating the geometry and slope of the stream where it was necessary to quickly drain the lands and make safe for livestock . The hydraulic conductivity was not a determining factor, and the drain is considered to be oversized (EOBMS, 2023c). The EPA define where a WFD river waterbody are heavily modified, the Garrynafela stream is part of the larger Shannon_110 WFD waterbody, where the modification status is listed as ‘unknown’.

The Garrynafela stream is culverted as it exits the Site to the North. The stream is culverted under the existing road. The culvert is a 900mm diameter concrete pipe at an invert level of 37.78mOD (EOBMS, 2023b). Water levels in the Garrynafela stream were low during the Site visit on the 28th of September, flow was minimal to stagnant across the Site.

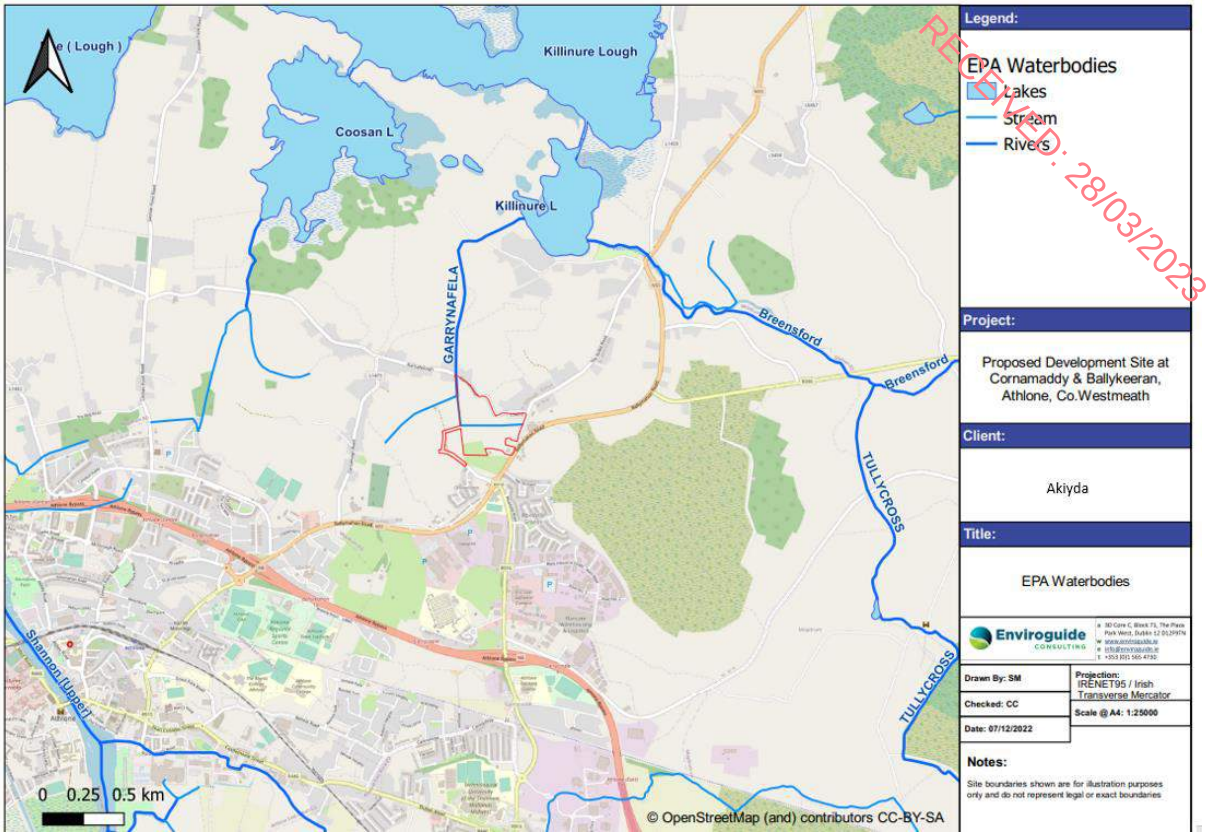

Figure 7-7: EPA Waterbodies

7.3.8 Site Drainage

The existing foul drainage network comprises an Irish Water manhole within the northwest boundary of the Site. The pipe flows northerly to the Athlone Wastewater Treatment Plant (WWTP) (License No. D0004-02) (IW, 2023). Treated water from the Athlone WWTP is discharged into the Shannon River west of the treatment plant (WFD Segment: Shannon (Upper)_130)).

There are no mapped surface water sewers (refer to dwg. 22-017-010) or watermains within the vicinity of the Site (EOBMS, dwg 22-017-009).

The Garrynafela stream that is located within the Site has 'evolved to its current depth and width to accommodate traditional activities on the lands' (EOBMS, 2023c). The drains are being managed by farmers. The slope and geometry developed in the drain the lands quickly due to the poor infiltration quality of the subsoil, to make safe for livestock.

7.3.9 Flooding

A site-specific flood risk assessment (FRA) report was produced (EOBMS, 2022a) for the Proposed Development Site. The FRA assessed the potential flood risk associated with coastal, tidal, fluvial and pluvial flooding. The FRS takes account of potential impact of climate change. The report concludes the:

- The Site is within Zone C (where the probability of flooding from rivers and the sea is low less than 0.1% or 1 in 1000 for both river and coastal flooding).
- The minimum finished floor level (FFL) is 40.5mOD, which is 4.5m above the 1% Annual Exceedance Probability (AEP).

- Review of the Athlone Flood Relief Scheme indicated the majority of the flooding close to Site was caused by the river approximately 2.5km south with no potential impact on the Proposed Development Site. There are no past flood events recorded within 2km of the Site.
- The Proposed Development is considered to be adequately protected in consideration of future scenario of flood events in the area.

7.3.10 Water Quality Data

7.3.10.1 Published Regional Surface Water Quality

The EPA surface water quality monitoring database was consulted and relevant water quality date pertaining to the Site was reviewed. There is no monitoring data in the tributary of the Shannon (Upper)_110 between the Site and the Ballaghkeeran Lake.

There are numerous lake stations within the Ballaghkeeran Lake water body, the baseline concentration for Ammonia, Chlorophyll and Total Phosphorus is presented in Table 7-6 below (EPA, 2022).

Table 7-6: Surface Water Quality

Location	EPA WFD Parameter Quality & Trend Analysis			
	Parameter	Indicative Quality	Trend	Baseline Concentration (mg/l)
Ballaghkeeran Lake (1.3km downstream from Site)	Ammonia – Total (as N)	High	Downwards	0.032
	Chlorophyll	Good	Upwards	6.683
	Total Phosphorus (as P)	Good	Upward	0.016

There is no publicly available groundwater quality data for the Athlone gravel aquifer or the Inny groundwater body.

7.3.10.2 Receiving Water Quality – Athlone

The most recent available Annual Environmental Report (AER) for Athlone WWTP is 2021 (Irish Water, 2021). The AER identified the final effluent was compliance with the Emission Limit Values (ELV) specified in the discharge license (D007-01). Importantly the 2021 AER notes:

"Based on ELV compliance, it is not considered that the discharge from the wastewater treatment plant is having an observable impact on water quality."

"The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status."

7.3.11 Water Use and Drinking Water Source Protection

A review of the GSI wells and springs database (GSI, 2023) has identified one borehole within a 2km radius of the Site (refer to Figure 7-8).The GSI notes the following on the well:

- Borehole (GSI Name 2023NWW102), the total recorded hole depth was 81.4mbgl and depth to bedrock was 3.6mBGL. Location accuracy is poor (within 1km). The source

use listed is “agricultural and domestic”. The yield class is “good” with a reported yield of 272.7m^3/day.

There are no Groundwater Source Protection Areas (SPAs) located within a 2km radius of the Proposed Development Site. The Shannon (Upper)_120 river is designated as an ‘Article 7 Abstraction for Drinking Water’ (EU Code: IE_SH_26S21800). The Coosan river waterbody (EPA Code: 26_4183) is a tributary of the main Shannon (Upper)_120 river waterbody is located approximately 1.9km to the west of the Site. The Coosan river is not hydraulically connected to the Proposed Development Site.

The overall Shannon (Upper)_120 is downstream of the Site. The hydraulic route from the Site is through the Ballaghkeeran, Killinure and Ree Lakes waterbodies, detailed in the Section 7.3.7.

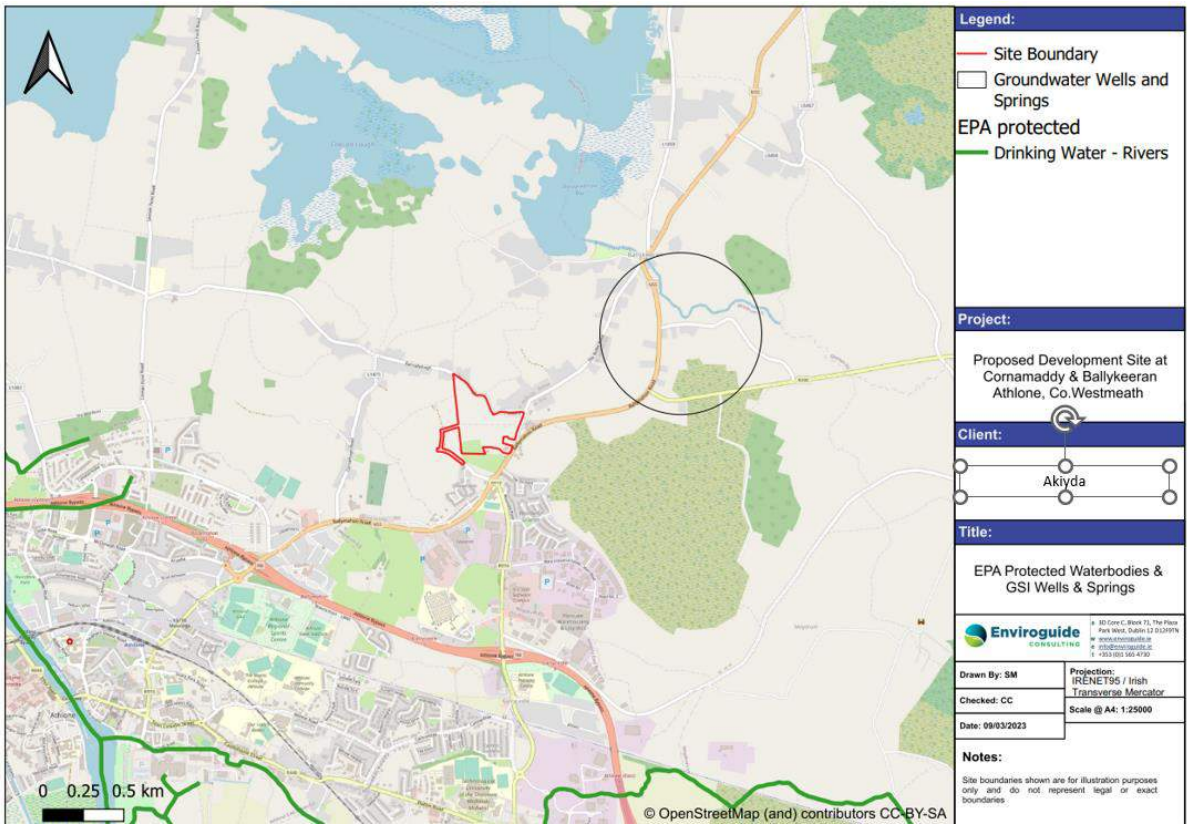

Figure 7-8: Water Use

7.3.12 Water Framework Directive Status

The WFD waterbody status for river, groundwater and coastal water bodies that have a potential hydraulic connection to the Site as recorded by the EPA (2022) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 7-7.

The Garrynafela stream on Site is part of the Shannon (Upper)_110 waterbody. The Coosan river is part of the Shannon (Upper)_120 waterbody. The treated effluent from the Athlone WWTP discharges to the Shannon (Upper)_120 waterbody.

Table 7-7: WFD Water body Status

Waterbody Name	Waterbody; EU code	Location from Site	Distance from Site (km)*	WFD Water body status (for the period of 2016-2021)	WFD 3rd cycle Risk Status
River Waterbodies					
Shannon (Upper)_110	IE_SH_26S021660	Within Site boundary	n/a	Poor	At risk
Shannon (Upper)_120	IE_SH_26S021920	Downstream	2.0	Poor	At risk
Shannon (Upper)_130	IE_SH_26S021800	Downstream	13.5	Moderate	Review
Shannon (Lower)_010	IE_SH_25S012000	Downstream	20.6	Moderate	Review
Shannon (Lower)_020	IE_SH_25S012060	Downstream	27.8	Moderate	At Risk
Shannon (Lower)_030	IE_SH_25S012350	Downstream	30.8	Moderate	Review
Shannon (Lower)_040	IE_SH_25A050100	Downstream	44.5	Good	Review
Shannon (Lower)_050	IE_SH_25S012500	Downstream	84.5	Poor	At Risk
Shannon (Lower)_060	IE_SH_25S012600	Downstream	89.3	Moderate	Review
Lake Waterbodies					
Ballaghkeeran	IE_SH_26_750d	Downstream	0.84	Moderate	Not at risk
Killinure	IE_SH_26_750b	Downstream	1.6	Good	Not at risk
Ree	IE_SH_26_750a	Downstream	3.0	Good	Not at risk
Coosan	IE_SH_26_750c	Downstream	1.3	Good	Not at risk
Derg TN	IE_SH_25_191a	Downstream	44.5	Moderate	At risk
Derg HMWB	IE_SH_25_191b	Downstream	78.7	Good	Review
Groundwater Bodies					
Athlone Gravels	IE_SH_G_246	N/A	N/A	Good	Not at risk
Inny	IE_SH_G_110	Downstream	N/A	Good	Not at risk
Transitional Waterbodies					
Limerick Dock	IE_SH_060_0900	Downstream	96.4	Poor	At Risk
Upper Shannon Estuary	IE_SH_060_0800	Downstream	102.0	Poor	At Risk
Lower Shannon Estuary	IE_SH_060_0300	Downstream	111.4	Good	Not at Risk
Coastal Waterbodies					
Mouth of the Shannon (Has 23;27)	IE_SH_060_0000	Downstream	141.5	Good	Not at Risk

*Distances are a bird eye measure from the Site, rather than a distance downstream

7.3.13 Designated and Protected Sites

There are ten (10No.) sites located within a 15km radius of the Proposed Development Site that are identified as Special Areas of Conservation (SAC) and two (2No.) Sites that are identified as Special Protection Areas (SPAs) (refer to Figure 7-9). There are sixteen (16No) Sites that are identified as proposed National Heritage Areas (pNHA) within a 15km zone of influence of the Proposed Development (refer to Figure 7-10).

The designated and protected Sites with a potential hydraulic connection with the Proposed Development are highlighted in Table 7-8.

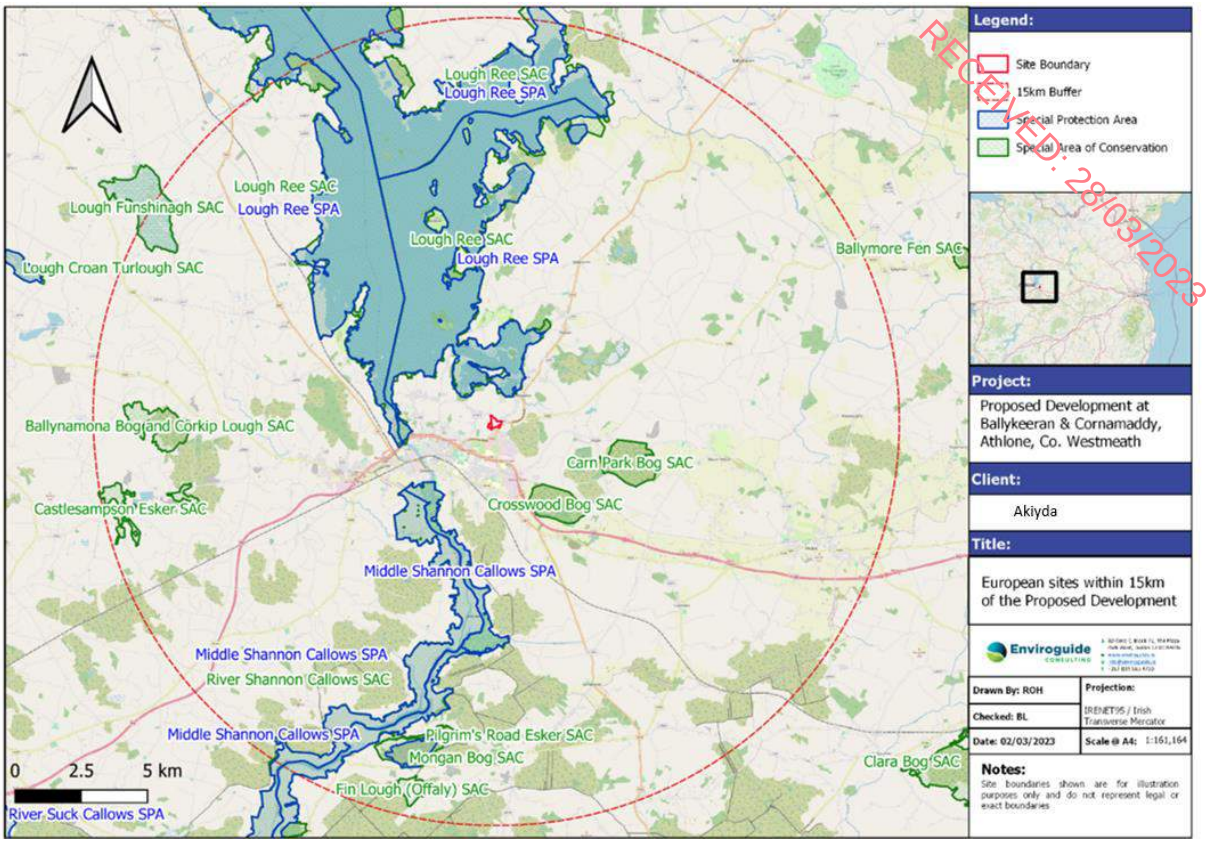

Figure 7-9. European Sites within 15km of the Proposed Development

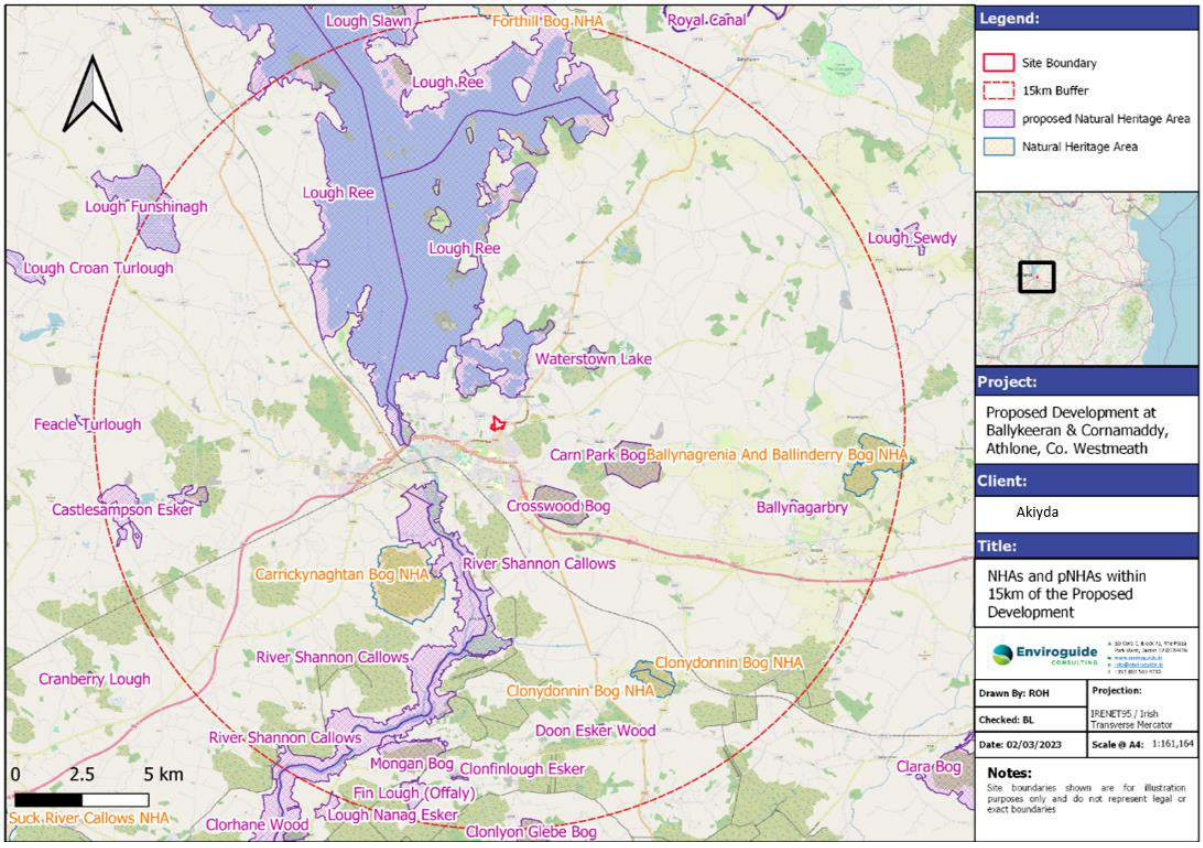

Figure 7-10. pNHAs and NHAs within 15km of the Proposed Development

Table 7-8: Designated and Protected Sites

Site Name	Site Code	Distance to Site and Direction	Hydraulic connection to Site
Special Protection Areas			
River Shannon Callows	000216	3.0km to the southwest	Yes, however significant dilution will occur in Ballaghkeeran, Killinure and Lough Ree prior to reaching SPA
Lough Ree	000440	0.84 km to the North	Yes
Special Areas of Conservation			
Lough Ree SAC	000440	0.84 km to the North	Yes
Lough Funshinagh	000611	13.4 km to the northwest	No
Ballynamona Bog and Corkip Lough	002339	11.5km to the west	No
Castlesampson Esker	001625	11.5km to the west-west-south	No
River Shannon Callows	000216	3.0 km to the Southwest	Yes, however significant dilution will occur in Ballaghkeeran, Killinure and Lough Ree prior to reaching SAC
Crosswood Bog	002337	2.6km to the South	No
Carn Park Bog	002336	3.9km to the east	No
Mongan Bogs	000580	2.6km to the South	No
Fin Lough (Offaly)	00576	13.5 km to the South	No
Pilgrim's Road Esker	001776	11.6km to the south	No
Proposed National Heritage Areas			
Carrickynaghtan Bog	001623	5.1km to the east	No
Clonydonnin Bog	00565	5.1km to the south	No
Ballynagrenaia and Ballinderry Bog	002339	9.9km to the south	No
Proposed National Heritage Sites			
Lough Ree	0.00440	0.84 km to the North	Yes
Lough Funshinagh	000611	13.4 km to the northwest	No
Faecle Turlough		15km to the west	No
Castlesampson Esker	001625	11.5km to the west-west-south	No
River Shannon Callows	000216	3.0 km to the Southwest	Yes, however significant dilution will

			occur in Ballaghkeeran, Killinure and Lough Ree prior to reaching pNHA
Crosswood Bog	002337	2.6km to the South	No
Carn Park Bog	002336	3.9km to the east	No
Mongan Bogs	000580	2.6km to the South	No
Fin Lough (Offaly)	00576	13.5 km to the South	No
Clonlyon Glebe Bog	000676	14.6km to the South	No
Doon Esker Wood	001625	11.7km to the South	No
Ballynagarbry	001713	11.2km to the southeast	No
Walterstown Lake	001732	3.7 to the northeast	No

7.3.14 Summary of Baseline Environment

The Proposed Development Site is predominately greenfield used for grazing of livestock. Historically the lands have predominantly been greenfield (with the exception of a building present to the south-east of the Site between 1995 and 2007).

The Garrynafela stream runs through the centre of the Site (which is part of the Shannon (Upper)_110 WFD catchment). The Garrynafela stream flows through the centre of the Site (east to west) to the western Site boundary and then flows in a northerly direction. The Garrynafela stream drainage channel has been modified in direction, depth and width to facilitate farming activity on Site (refer to Section 7.3.7).

Additional tributaries join from the lands west of the Site before the Garrynafela stream discharges to the Ballaghkeeran lake approximately 0.84km north of the Site. The Ballaghkeeran LWB is part of the 'Lough Ree' SPA/SAC.

The depth to bedrock is greater than 4mbgl. The boreholes on Site were drilled in summer 2022. Shallow groundwater was encountered in the subsoils with strikes recorded between 1.3 and 2.7mbgl. Water levels post drilling were between 1.3 and 1.7mbgl. Groundwater levels are likely to be seasonal on Site, with highest groundwater levels present in winter and lower groundwater levels in the summer. Groundwater flow direction is considered to be towards the lake waterbodies to the north and northwest of the Site.

Rainfall to the Site will infiltrate the gravels and recharge the underlying Athlone Gravel Aquifer and the underlying Waulsortian limestones (both of which are considered locally important aquifers). There is limited capacity for the peat to received recharges (GSI estimate is 19 mm/year), overland flow will occur to the Garrynafela stream.

7.3.15 Description of Site Importance

Taking account of the receiving hydrological and hydrogeological environment, the importance of the Proposed Development Site is considered to be "medium" given that 'Athlone Gravel' gravel aquifer and the 'Inny' bedrock aquifer beneath the Site are classified as 'locally

important aquifers' and considering there is only one recorded water well within a 2km radius of the Site listed i.e., potable water is supplying less than 50 homes.

7.4 Characteristics of the Proposed Development

The characteristics required to carry out the Proposed Development in Section 7.1.2 are detailed in Section 7.4.1 and Section 7.4.2.

7.4.1 Construction

The Construction Phase of the Proposed Development will include:

- Groundworks and excavation to reduced levels to construct foundation, utilities, and roads.
- Construction of new foul system for the Proposed Development and connection to existing Irish Water Connection to the northwest of the Site.
- Construction of new water network for the Proposed Development and connection of to the existing Irish Water 150mm HDPE water main on the N55.
- Surface water sewage network construction and construction of SuDs including permeable paving, cellular attenuation systems, petrol inceptor and hydro-brake flow control (EOBMS, 2023b). Connection of four (4No) new attenuation tanks to outflows locations on the Garrynafela stream.
- Importation of aggregates for construction of utilities and roads.
- Groundwater dewatering may be required if groundwater is encountered during excavation, water will be pumped from excavation to temporary on-site drainage system prior to discharge overland through vegetation.
- The Garrynafela stream running through the Site will be culverted and realigned in sections of the existing drainage channel. The stream will be culverted using a box culvert with dimensions: 1,200mm width by 1,200mm height (refer to Drawing 22-017-1101 and 22-017-022- Culvert and Outfall Details). The sections to be culverted are shown in EOBMS drawing 22-017-1101 (refer to Appendix G).
- Installation of rainwater harvesting system (Kingspan rainwater system or similar)

7.4.2 Operational Phase

During operation, all storm water from the Site will be directed through a separate gravity storm sewer. The development is split into three (3no) catchment areas (of which catchment No.2 is subdivided into two catchments). Each catchment area will avail of SuDs including permeable paving and bio retention areas in addition to an attenuation tank. The SuDS will attenuate flow to greenfield runoff flows using a hydro-brake. Restriction of flow will be by a vortex flow control device, excess flow will be directed and attenuated within an Aquacell stormwater (or equivalent) attenuation system (EOBMS, 2022b). A petrol interceptor (Klaregester full retention separator (NSFP20)) will be installed at each of the attenuation tanks to cater for any accidental or wash down drainage from the car parks. The outfall from each of the attenuation tanks (4 no. in total) will be to the Garrynafela stream at four separate outfall locations. The location of the attenuation tanks and outflows are indicated in Figure 7-11 (and are further detailed in EOBMS drawing pack, dwg no. 22-017-010).

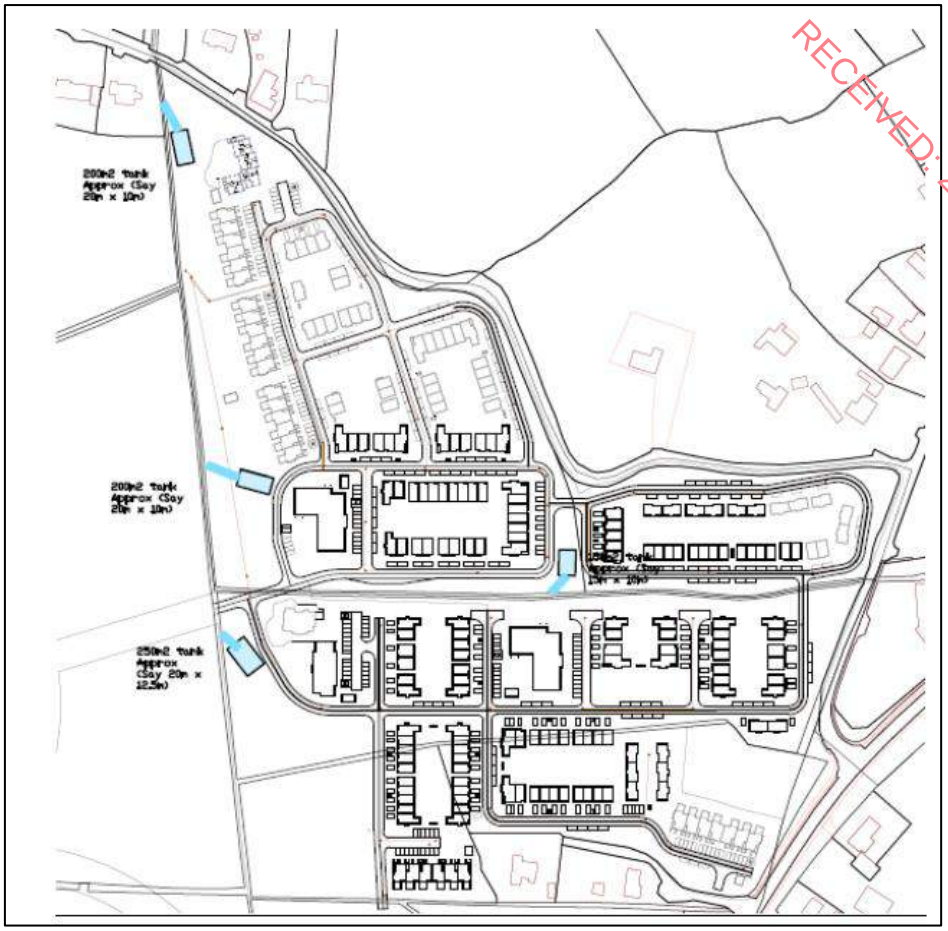

Figure 7-11: Attenuation Tank and Outflow Locations (EOBMS, 2023b)

Rainwater harvesting will collect rainwater for irrigation and other uses (EOBMS, 2023b).

Foul water from the Proposed Development will be connected to the existing Irish Water foul sewer network (at manhole to the northwest of the Site (refer to drawing 22-017-010 Drainage Layout, EOBMS 2023)) that eventually discharges Athlone WWTP. Confirmation of feasibility (COF) was received from Irish Water on the 13th of November 2020 (Ref: CDS200001202). The wastewater connection is 'Feasible without infrastructure upgrade by Irish Water'. The Irish water site-specific comments for the wastewater connection note:

"There is sufficient capacity in the existing downstream network at this time to facilitate the proposed development"

Foul water drainage and water supply infrastructure will be designed and constructed to comply with current standards and guidelines as specified in the Planning Application Services Report (EOBMS, 2023b)

- BS EN 752-4: 'Drain and sewer systems outside buildings. Hydraulic design and environmental considerations'
- 'BS8302 Code of practice for building drainage' (guidance only)
- Technical Guidance Document H Drainage
- Waste Water Disposal Arna Fhoilsiu ag Oifig an tSolathair

The construction of foul and surface water will comply with current construction regulations and IW guidance including the Code of Practice for Wastewater Infrastructure and Code of Practice for Water Infrastructure.

Water supply to the Proposed Development will be provided by connection to the mains Irish Water supply via a new 150mm connection to the existing 150mm diameter watermain running along the N55. Confirmation of feasibility was received from Irish Water on the 13th of November 2020 (Ref; CDS200001202). The water connection is 'feasible without infrastructure upgrade by Irish Water". Irish water notes the following site-specific comment in relation to water connection:

"The Athlone Water Treatment Plant upgrade works currently underway will provide additional capacity for development in Athlone. As such there should be no supply issue to this 350-unit development, considering the proposed phasing of the development. A new 150mm diameter water connection from the existing 150mm HDPE water main on the N55 will be required to supply this development"

7.5 Potential Impact of the Proposed Development

7.5.1 Construction Phase

Hydrogeological Flow Regime

The Site is currently predominately greenfield land. The construction of the Proposed Development will convert greenfield surface to impermeable surfaces due to the construction of houses, roads, and other infrastructure.

During the Construction Phase soil and subsoil will be exposed and excavated with an increase in the potential of infiltration rainfall to the underlying aquifer where the thickness of subsoils is reduced. This will be reduced over the course of the construction of the Proposed Development with an overall increase in impermeable areas and reduced infiltration potential from the surface. Groundwater strikes were encountered between 1.3 and 2.7mbgl (refer to 7.3.6). The planning application services report notes maximum depth of excavation is normally 5m for surface water sewers and foul water connections (EOBMS, 202bc). Thus, It is anticipated that groundwater will be encountered during trench excavation for the utility infrastructure. Localised dewatering may be required, where water must be pumped from the excavation, it is considered there will be a temporary drawdown of local groundwater levels. The potential impact of dewatering on groundwater flow regime is 'negative' 'slight' and 'temporary'. However, the extent of the impacts will be localised to the immediate area surrounding the excavation.

Water Quality

Sources of contamination that could impact on water quality arising from the construction of the Proposed Development Site include:

- Storage and use of fuel, oils and chemicals used during construction which in the event of an accidental release could discharge to on-site stream as surface water run-off or to infiltrate to underlying groundwater (gravels).

- Use of concrete and cementitious materials or other potentially hazardous materials during construction in particular for below ground where shallow groundwater may be encountered.
- Sediment disturbed during instream works for the culvert along sections of the Garrynafela stream.
- Accidental release of contaminants during instream works i.e., fuel spill from vehicles operating on banks of the Garrynafela stream.
- Discharges or leaks from temporary welfare facilities could introduce contaminants to the water environment.
- Sediment or contaminants entrained in groundwater encountered during dewatering.
- Release to groundwater of foul water during connection of new infrastructure to live sewers.
- Runoff with entrained sediment to surface water drains and surface water drainage on Site.

The potential pathways and pollutant linkages for the construction phase as :

- Infiltration of contaminants to the subsoils (gravels to the east of the Site) and into gravel and bedrock aquifer.
- Overland flow during rainfall events into the Garrynafela stream
- Downstream tracking of contaminants from the Garrynafela stream to downstream receptors
- Dewatering during construction of roads and utilities into the Garrynafela stream. Potential release of sediment or other potentially contaminating compounds to the public surface water/ foul sewer during construction.

The potential receptors of water from the Site are:

- Garrynafela stream (which is part of the Shannon (Upper)_110) and downstream to the Ballaghkeeran Lake (which form part of Lough Ree SAC);
- Underlying gravel and bedrock aquifers; and
- The Lough Ree SAC.

The flow pathway from the site was tracked downstream to the Mouth of Shannon coastal waterbody (all downgradient waterbodies are presented in Table 7-7). However, given the low flows observed on Site and the distance between downstream receptors, any sediment will settle in the Garrynafela stream before reaching any downstream waterbodies. The Shannon (Upper)_110 sub-basin (which the Garrynafela stream is a part of) covers large area (258 km^2, EPA, 2022) and contains numerous streams discharging into the Lough Ree lakes, the outlet and transition into the Shannon (Upper)_120 is at the outlet of the Ree Lake water body (the Ree Lake covers an area in 100km^2). Thus, even in a worst case scenario, any discharges from the Site will be subject to significant dilution.

During excavation, there is a risk to the underlying gravel and bedrock aquifer due to the accidental release of fuels or other contaminates to exposed gravel subsoil creating a direct pathway to the underlying aquifers. In a worst case, un-mitigated scenario there is a potential 'negative'' significant' and 'long-term' impact to the gravel aquifer.

The worst-case scenario considered is the potential spillage of hydrocarbons or release of sediment during in-stream works in the Garrynafela stream tracking downstream to the receiving Lough Ree SAC/SPA located 0.84km north. In the absence of standards and appropriate construction management and mitigation measures and depending on the nature and size of the spill. Flows observed on Site were low to stagnant and tracking downstream would require additional flow in the stream such as following heavy rainfall event, during high flow events, dilution in the stream will also increase, diluting any spillages which have occurred. Lough Ree is the second largest lake in the River Shannon system after Lough Derg, the SAC/SPA is located approximately 0.84km downstream and covers an area of over 100m^2. Any impact will be localised to the Ballaghkeeran Lake due to dilution which will occur. There is a potential 'negative' 'moderate' and 'medium term' impact on the Garrynafela stream and Ballaghkeern lake which is part of the Lough Derg SAC/SPA in a worst-case scenario.

Groundwater dewatering may be required during the excavation of the roads and trenches (for building foundations and utility infrastructure). Any groundwater removed will be discharged into the public sewer in accordance with the necessary consent/licence issued under Section 16 of the Local Government (Water Pollution) Acts and the Local Government (Water Pollution) Act 1977 (as amended) will be obtained from Irish Water (IW) or Westmeath County Council.

In the absence of mitigation measures, there is a potential 'negative', 'moderate' and 'medium-term' impact in the receiving surface and groundwater quality due to the unmanaged sediment laded/ contaminated waters from the Site.

7.5.2 Operational Phase

Hydrological & Hydrogeological Flow Regime

The potential impact on the groundwater flow regime associated with the Proposed Development

There will be some discharge to ground via SuDs (permeable paving and bio- retention areas) as well as rainfall which falls on unpaved areas. Rainwater harvesting will be utilised on Site, collected rainwater will be used for care and upkeep of the lawns and gardens which will infiltrate to ground and recharge (EOBMS, 2023b) ; thus, the water mass balance is not impacted by rainwater harvesting on Site.

Storm flow from the Proposed Development Site will be attenuated to pre-development greenfield conditions (EOBMS, 2023b), there will be no increase or decrease in flow to the Garrynafela stream. Most of the rainfall which falls on Site will flow to through the on-site attenuation system prior to discharge to the Garrynafela stream, thus there will be a reduction in the rainfall available to recharge. The impact of the Site Development on the hydrological and hydrogeological flow regime will be "negative", "slight" and "long term".

During operation, sections of the Garrynafela stream running through the Site will be culverted and redirected in sections (refer to Ballykernan stream, Design Changes Report (EOBMS, 2023c) for culvert sections). The Garrynafela stream will remain open along the western

boundary of the Site. The stream becomes culverted again as it exits the Site to the north of the Proposed Development (this infrastructure is existing and is part of the baseline). The culvert will be designed to mimic the existing channel characteristics and provide enough air space within the culvert for access and cleaning (i.e., 1200mm wide by 1200mm height) (EOBMS, 2023c). The Garyynafela Stream has previously undergone human intervention and is considered heavily modified. The culvert is considered to have an overall a "negative", "slight" and "permanent" impact on the Garrynafela stream on Site.

Flood Risk

As documented in the Site-Specific Flood Risk Assessment (EOBMS, 2022a), the Proposed Development Site is located within Flood Zone C "where the probability of flood from river and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding". The Site is appropriate for the Proposed residential development from a flood risk perspective (EOBMS, 2023a).

Therefore, it is considered that the potential impacts of flooding associated with the Proposed Development results in an overall 'neutral', 'imperceptible' and 'long-term' impact on the Proposed Development Site.

Water Quality

There will be no significant sources of contamination at the Site during the Operational Phase taking account of the following design considerations:

- There will be no bulk storage of petroleum hydrocarbon-based fuels or other hazardous materials during the Operational Phase, thereby no associated potential contaminant sources.
- There will be no discharges to ground other than rainfall to unpaved landscaped areas and via limited recharge from SuDs (permeable paving and bio retention areas). Discharge will be to the Garrynafela stream following attenuation via the SuDs on Site removing any potential contamination prior to discharge. A petrol interceptor is proposed above each of the attenuation tanks prior to discharge.
- Foul water from the Site will be discharged to mains sewer and will be treated at the Athlone Wastewater Treatment Plan (WWTP) prior to discharge to the Shannon River.
- The proposed surface drainage design in accordance with GDSDS and SuDS strategy includes measures that will capture any potentially contaminating compounds (petroleum hydrocarbons, metals, and suspended sediments mobilised from contaminated soils) in surface water runoff from roads and the impermeable areas that could potentially otherwise discharge to the receiving water environment.

There will be negligible risk to water quality during Operational Phase taking account of these embedded design avoidance measures. Therefore, it is considered that there is an overall positive impact on water quality of groundwater, resulting in a "positive", "slight" and "Long-term" impact.

In the absence of the embedded design, avoidance and mitigation measures (i.e., petrol interceptor and SuDS measures) there would be a potential impact on the receiving water of the Garrynafela steam. A worst-case unmitigated discharge of surface water drainage could result in a 'negative', 'moderate' and 'medium-term' impact on water quality within the

Garrynafela stream. Due to dilution, which will occur the impact on the downstream Ballaghkeeran Lake is considered be 'negative', 'slight' and 'medium-term' impact on water quality. There is no perceived impact on another further downstream waterbodies due to dissolution and dilution in the Ballaghkeern Lake.

Foul Water

Foul water from the Site will ultimately be treated in Athlone WWTP. The Athlone WWTP discharges to the Shannon River (at the Shannon (Upper)_120 WFD segment). All below-ground drainage infrastructure will be constructed in accordance with Irish Water Code of Practice for Wastewater Infrastructure (Irish Water, 2020a). Therefore, preventing any potential impact on the receiving groundwater as a result of leaking foul effluent to ground.

The confirmation of feasibility was received from Irish Water in November 2020 (confirmed in EOBMS Engineering Report, 2022b) noting that a wastewater connection was "feasible without infrastructure upgrade by Irish Water". Therefore, on the basis that foul water from the proposed development will only be discharged to public sewer under agreement from Irish Water and other applicable statutory consents, it is considered that there will be a 'neutral', 'imperceptible' and 'permanent' impact on the surface water quality of the receiving environment.

7.5.2.1 Secondary

There are no secondary impacts associated with the Operational Phase of the Proposed Development.

7.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

Existing Planning Permissions

A number of relevant planning applications have been lodged previously for lands in the vicinity of the Proposed Development Site. As outlined in Table 7-9 the cumulative effects of the Proposed Developments on the hydrological and hydrogeological environment have been assessed taking other planned, existing and permitted developments in the surrounding area into account.

Table 7-9: Existing Planning Permissions

Planning Ref No.	Applicant Name	Summary of Development
22253 26/10/2022	Marina Quarter Ltd	The development will consist of the following: • Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west

Planning Ref No.	Applicant Name	Summary of Development
		facing terraces; • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the south east of the site. • All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. ESB substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; • This development will form part of a larger/future phase of the development; • No changes to the existing pumping station located outside the northern site boundary; A Natura Impact Statement has been prepared in respect of this application.
22340 Decision Due Date: 04/02/2023	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area(c. 595 sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a sections of the distributor road permitted under WMCC Reg. Refs 14/7103 ABP Ref. PL25.244826 and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting,

Planning Ref No.	Applicant Name	Summary of Development
		associated ESB substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

Water Supply

The Proposed Development will be connected to the existing water mains supply under consent from Irish Water. Therefore, there will be no cumulative impacts associated with the Proposed Development. Thus, the impact of the Proposed Development on Water Supply is "neutral", "imperceptible" and "long-term".

Foul Water

Capacity within the existing foul sewer network has been confirmed by Irish water . Therefore, there will be no cumulative impacts associated with the Proposed Development from foul water generation, the impact from the Proposed Development on groundwater will be 'neutral', imperceptible' and 'long-term'.

Sediment and Debris

The transport of material to and from the Site during construction, if not appropriately managed could result in sediment and debris being tracked off-site on trucks and other site vehicles from the Proposed Development and other development sites in the area. There is risk of impact to water courses at off-site locations in the immediate vicinity of the Site due to sediment and other potential contaminants (e.g. fuel drips) entrained in road runoff entering the surface water drainage system and out falling at off-site locations.

There are no other cumulative impacts associated with the construction or operational phase of the Proposed Development.

7.5.4 "Do Nothing" Impact

In the "Do Nothing" scenario, it is considered that the Proposed Development did not proceed and the potential impact on the receiving hydrological and hydrogeological environment is considered.

If the Proposed Development did not proceed the Site would remain as greenfield. There would be no change to the drainage at the Site or to the hydrological and hydrogeological regime at the Proposed Development Site.

7.6 Avoidance, Remedial & Mitigation Measures

The mitigation measures, as outlined below, will ensure that there will be no significant impact on the receiving groundwater and surface water environment. Hence, the Proposed Development Site will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities

Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

7.6.1 Construction Phase

The Construction Environmental Management Plan (CEMP) (EOBMS, 2023a) and a Resource Waste Management Plan (RWMP) (AWN, 2022b) will be implemented by the appropriate contractor to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and ensure the construction activities do not adversely impact on the environment.

Mitigation measures will be adopted as part of the construction works on the Proposed Development Site. The measures will address the main activities of potential impact which include:

- Control and management of water and surface runoff.
- Control of management of instream works
- Management of dewatering during construction.
- Management and control of materials from off-site sources.
- Appropriate fuel and chemical handling, transport, and storage; and
- Management of accidental release of contaminants at the Site.

The construction works will be managed in accordance with all statutory obligations and regulations and with standard international best practice; good construction management practices will minimise the risk of pollution from construction activities at the Site including but not limited to:

- EPA 2004 and revised 2013) IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004
- Inland Fisheries Ireland (2020) Planning for Watercourses in Urban Environments
- Inland fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters
- Construction Industry Research and Information Association (CIRIA) standards:
    - The SuDs Manual, 2015 (C753)
    - Environmental Good Practice on Site, 2015 (C741)
    - Control of Water Pollution from Linear Construction Projects: Site Guide, 2006 (C649)
    - Control of Water Pollution from Linear Construction Projects: Technical Guidance, 2006 (C648)
    - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, 2001 (C532)

7.6.1.1 Control and Management of Water

Groundwater may be encountered during the construction works. Robust dewatering and water treatment methodologies in accordance with best practice standards (CIRIA – C750), the CEMP (EOBMS (2023d), RWMP (AWN, 2022b) and regulatory consents to minimise the potential impact on the local groundwater flow regime within the soil and bedrock. Any groundwater removed will be discharged into the public sewer in accordance with the necessary consent/licence issued under Section 16 of the Local Government (Water Pollution) Acts and Regulations which will be obtained from Irish Water (IW) / Westmeath County Council.

Groundwater will be pumped from excavations to temporary on-site drainage system prior to overland discharge through vegetation. The discharge will be pumped through a silt bag at the pump outlet and through a series of silt traps as required). Silt fencing will be erected on ground sloping towards the watercourses at the stream crossings. These will be embedded int local soils to ensure all site runoff water is captured and filtered (EOBMS, 2023d).

As the construction works advances, there may be requirements to collect and treat surface water on site. The following site-specific measure are outlined in the CEMP (EOBMS, 2023d) and will be adhered to for the duration of the construction works:

- Surface water will be collected using perimeter swales at low points around construction areas, where required water will be pumped from the swales into sediment bags prior to overland discharge allow water to percolate naturally to ground or disperse as diffuse flow into local drainage ditches.
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The discharge areas will be enclosed by a perimeter of double silt fencing.
- Any proposed discharge area will avoid potential surface water ponding areas and will only be located where subsoils are present.
- No pumped construction water will be discharged directly into any local watercourses.
- Daily monitoring and inspection of site drainage during construction will be undertaken.
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation to watercourses.

There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the Construction Phase of the Proposed Development and sandbagging of gullies may be required during specific works in the vicinity of the existing Proposed Development Site drainage.

7.6.1.2 Management from runoff from Stockpiles

The stockpiling of material on-site will be avoided where possible. However, there material is being temporality stockpiled on-site pending re-use or classification for removal off-site, the material will be temporarily stockpiled in designated areas. Stockpiles will be located, arranged and managed so that the risk to receiving water and other receptors, from silt and contaminated is minimised. All stockpiled materials will be located a minimum of 50m from water courses during the construction phase (EOBMS, 2023d). Silt fencing will be erected where there is a risk of run-off during prolonged rainfall.

7.6.1.3 Control and Management of Works in Site Water Courses

All necessary works carried out in the Garrynafela stream for the construction of the culvert will following the guidelines by Inland Fisheries Ireland (IFI) Guidelines on the Protection of Fisheries during Construction Works in and Adjacent to Waters (2016) and the National Roads Authority (now Transport Infrastructure Ireland) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. All works will be carried out in accordance with an approved method statement prepared by an appropriately qualified Environmental /Ecological Clerk of Works employed by the Contractor.

A watching brief by the Environmental/ Ecological Clerk of Works will be required during all stages of the instream works of the Garrynafela stream. Continuous monitoring of turbidity and pH will be undertaken during the installation of the box culverts.

Culvert of the stream will occur at the outset of the construction works (EOBMS, 2023d).

- Culverting will take place prior to stripping of any topsoil from the Site.
- The Garrynafela Stream will be culverted during low flow/ dry conditions and undertaken in sections.
- The upstream end of the culvert will be dammed, and water will be over pumped to the downstream end.
- The pumped water will be discharged overland via silt bags at the downstream end of the culvert.

The Environmental Clerk of works will visually inspect the water quality during the work, observant of suspended sediment or contaminants to the stream. Silt fencing will be erected downstream of the section undergoing culverting, entrained sediment captured will be removed and exported under appropriate waste disposal. Install will take during low flow conditions; no works will occur during periods of high rainfall.

Prior to installation of the culvert, a constraints zone will be identified and implemented at the construction area adjacent to the Garrynafela stream. This will:

- Ensure the avoidance of physical damage to the Garrynafela stream banks and riverbed.
- Ensure that no suspended sediment and associated nutrients are released into surface water from other
- There will be no stockpiling of construction materials or other materials within the constraints zone and excess construction material will be immediately removed from the area.
- There will be no entry for the construction of the culverts , which is strictly prohibited for plant
- All machinery operations will take place from the riverbank

7.6.1.4 Importation of Soil and Aggregates

Contract and procurement procedures will ensure that all aggregates and fill material required are sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity and compliance standards and statutory obligations.

The importation of aggregates will be subject to management and control procedures which will include testing and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development including the suitability of

material that may be imported in accordance with a By-Product Notification under Article 27 of the European Communities (Waste Directive) Regulations 2011. Therefore, any unsuitable material will be identified, avoided, and not imported to the Site.

7.6.1.5 Concrete Works

The use of cementitious grout used during the construction of footpaths (and other Site infrastructure) will be required and any potential impact to water quality will be avoided through the use of appropriate design and methods that will be implemented by the Contractor and in accordance with industry standards.

Where possible precast concrete will be used for culverts and concrete works. However, where cast-in-place concrete is required (i.e., foundations, footpaths), all work will be carried out to avoid any contamination of the receiving water environment. All work must be carried out in dry conditions and be effectively isolated from any groundwater.

The following mitigation measures are outlined in the CEMP (EOBMS, 2023d) to avoid release of cement leachate to the Site:

- All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. There will be no batching of wet-cement products on Site.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on Site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete.
- Ensure pour Site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

The piling methodology (specified at detailed design stage) where required, will minimise the potential for the introduction of any temporary conduit between any potential source of contamination at the ground surface and underlying groundwater. The piling method will include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

7.6.1.6 Handling of Fuels and Hazardous Materials

Fuel, oils and chemicals used during construction are classified as hazardous. All fuels/soil and all storage tanks and draw-off points will be located in a dedicated, bunded and secure area of the Site (AWN, 2022). Only dedicated trained and competent personal will carry out refuelling operations (EOBMS, 2023d). Each station will be fully contained equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on-site.

The CEMP (EOBMS, 2022d) outlines fuel and oil control procedures which will be implemented during the Construction of the Proposed Development including:

- All plant and machinery will be serviced before being mobilized to Site.
- No refueling of machinery or overnight parking of machinery is permitted in areas adjacent to watercourses or on-site drainage infrastructure.
- Fuel volumes stored on Site should be minimised. There will be no bulk storage of fuels.
- On-site refueling will only take place at distances greater than 50 meters from nearest water courses or Site drainage infrastructure. Refueling will take place by direct filling from a delivery truck or using a mobile double skinned fuel bower.
- On-site refueling of machinery will be carried out using an oil company vehicle sourced from a local supplier.
- Only dedicated trained and competent personnel will carry out refueling operations.
- A spill kit and drip tray shall be on Site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling.
- Spill kits shall be available in each item of plant required.
- Care will be taken to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.

The plant refueling procedures described above shall be detailed in the contractor's method statements (EOBMS, 2023d). Refueling on Site will only take place in designated bunded areas.

Any required quality of these materials will be stored in bunded storage tanks. Bunds will have regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013) and Enterprise Ireland Best Practice Guide BPGCS005. Oil Storage Guidelines. All tank and drum storage areas will, 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.

Only emergency maintenance will be carried out on Site.

Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.

Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.

In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with current industry best practice procedures and EPA guidelines.

Site staff will be familiar with emergency procedures in the event of accidental fuel spillages and all staff on-site will be fully trained on the use of equipment to be used on-site.

7.6.1.7 Welfare facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Temporary port-a-loo toilets will be used during construction. The facilities will require periodic waste pumping and waste haulage off-site. Wastewater will be tankered off-site by permitted waste collector to wastewater treatment plant. The removal and disposal of wastewater from Site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007 (EOBMS, 2023d). All waste from welfare facilities will be managed in accordance with the relevant statutory obligations. Removal of waste off-site will be by an appropriately authorised contractor in compliance with all legislative requirements.

7.6.1.8 Wheel-Wash and Water Treatment Facilities

The use of wheel-wash and water treatment facilities and water treatment facilities will be used as required on Site. The correct use and management of these will be undertaken by the appointed contractor to ensure that there is no harm or impact to the receiving water environment.

To prevent tracking of dust and debris on haul routes off-site, on-site wheel washing will be undertaken for construction vehicles to remove any debris on the local roads.

7.6.2 Operational Phase

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures in accordance with CIRIA SuDS Manual C753 will be incorporated into the overall management strategy for the Proposed Development.

With regard to the proposed discharge of treated operational surface water from the Proposed Development to the culverted Garrynafela stream, the potential for surface water generated at the Site of the Proposed Development to cause significant effects to downstream sensitivities during the Operational Phase would be considered negligible due in part to the SuDS measures and interceptor incorporated in the Project Design.

7.6.3 “Worst Case” Scenario

During the Construction Phase or Operational Phases there is a potential risk of accidental release of petroleum hydrocarbons (e.g., a fuel spill) that could migrate to groundwater or off-site to surface water via Site drainage could result in in a ‘negative’, ‘significant’, ‘long-term’ impact on the quality of the receiving water depending on the nature of the incident.

In the event of a worst-case scenario such as a fuel spill or release of other hazardous compounds occurring during the in-stream works, this could result in a potential impact on groundwater or surface water in the absence of appropriate control and mitigation measures.

However, taking account of the avoidance and mitigation measures the worst-case scenario is deemed to be an unlikely scenario.

7.7 Water Framework Directive

In a worst-case scenario, there is a potential risk of accidental release of fuel or chemicals during the Construction Phase, and a risk of untreated water via failure of SuDs or rupture of the drainage system during the operational phase, with potential impacts on the receiving water environment and Water Framework Directive. As outlined in Section 7.3.9, the Water Framework Directive status for the Shannon (Upper)_110 (in which the Garrynafela stream is apart) is Poor and is considered "at risk" of achieving its WFD objectives. As outlined in the potential impacts of the Proposed Development (section 7.5.1), any discharge from the Site will be subject to significant dilution due to the size of the waterbodies to which it discharges.

In addition, the mitigation measures as outlined above, including the SuDS in accordance with the GDSDS and construction mitigation measures, will prevent any impact on the receiving groundwater and surface water environment. Hence, the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

Thus, the Proposed Development will not cause a deterioration in the status of water bodies hydraulically connected with the Proposed Development including the Athlone Gravels groundwater body, the Inny groundwater body, the Shannon (Upper), Lough Ree Lakes, Shannon (Lower), Limerick Dock, Shannon Estuary or Mouth of Shannon coastal water body, taking account of design avoidance and mitigation measures that will be implemented. The Proposed Development will not jeopardise objectives to achieve good surface water status or good ecological potential. Interceptors on Site will lead to a positive impact on water quality.

The impacts of the Proposed Development on the Water Framework Directive will be "neutral", "imperceptible" and "permanent".

7.8 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

The predicted impacts of the Construction and Operational Phases are described in Section 7.5 and summarised in Table 7-10 in terms of quality, significance, extent, likelihood, and duration and the residual impacts which take account of the avoidance, remedial and mitigation measures.

There are no likely significant adverse residual impacts on hydrology and hydrogeology anticipated regarding this Proposed Development.

Table 7-10: Residual Impacts

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Excavation and Dewatering	Hydrological/ Hydrogeological flow Regime	During construction, recharge will temporarily increase as soils and subsoils are exposed and excavated. Groundwater dewatering will cause temporary drawdown in the gravels and reduce the saturated water content in the soils.	Negative	Slight	Temporary	Direct	Robust dewatering and water treatment methodologies in accordance with best practice standards (CIRIA – C750), the CEMP (EOBMS (2023d), RWMP (AWN, 2022b) and regulatory consents to minimise the potential impact on the local groundwater flow regime within the soil and bedrock.	Imperceptible
Accidental release of deleterious materials including fuel and other materials being used on-site/ In stream works	Water Quality – Groundwater and Surface	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used on-site, through the failure of secondary and tertiary containment, a materials handling accident or during the instream works. Risk to the underlying aquifer when subsoils are exposed during construction.	Negative	Significant	Long Term	Worse case	Refuelling of plant during the Construction Phase will only be carried in a designated impermeable area on-site equipped with spillage kits. Any other diesel, fuel or hydraulic oils stored on-site or within fuel containing equipment will be stored in bunded storage tanks / drip trays. An environmental watching brief will be required for the duration on the construction of the culvert.	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Operational Phase								
In stream works	Surface water flow	Parts of the Garrynafela stream on site will be culverted and re-routed during the construction of the Proposed Development.	Negative	Significant	Permanent	Direct	The culvert has been designed to mimic the existing channel characteristics and provide air space for access and cleaning (1200mm x 1200mm) The presence of culvert will reduce potential for surface contamination. The Garrynafela is considered heavily modified. The stream route has previous been rerouted and the shape has been altered for drainage purposes.	Imperceptible
Proposed Development Drainage	Flood Risk	There is no identified flood risk associated with the Proposed Development.	Neutral	Imperceptible	Long Term	Direct	None	Imperceptible
Management of SuDs	Water Quality	In a worst case scenario, In the absence of the embedded design, avoidance and mitigation measures (i.e., petrol interceptor and SuDS measures) there would be a potential impact on the receiving water of the Garrynafela steam	Negative	Slight	Medium Term	Worse Case	Monitoring and maintenance regime will be implemented for the duration of the development	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Discharge to Foul Sewer	Mains Sewer and receiving water at Athlone WWTP	Discharges to sewer will only be permitted where authorised by Irish Water.	Neutral	Imperceptible	Permanent	Indirect /Cumulative	None required	Imperceptible
Water Supply from IW	Water Supply	Water supply to the Proposed Development will be from the existing IW water supply infrastructure and will be operated in accordance with the appropriate statutory consents.	Neutral	Imperceptible	Long Term	Cumulative	None required.	Imperceptible

7.9 Monitoring

7.9.1 Construction Phase

During the construction phase the following monitoring measures will be considered:

- The Contractor will carry out inspections and monitoring during excavations and other groundworks to ensure that measures protective of water quality outlined in this EIAR and CEMP (EOBSM, 2023d) are fully implemented and effective.
- Routine monitoring and inspections during refuelling and concrete works to ensure no impacts and compliance with avoidance, remedial, and reductive measures.
- Baseline surface water sampling is required prior and post culvert works, upstream and downstream of the culvert. During construction of the culvert, field parameters including pH and conductivity should be regularly monitoring.
- The instream works be overseen by an appropriately qualified Environmental/ Ecological Clerk of Works (ECOW) engaged by the appointed contractor.
- Regular monitoring will be carried out by the contractor to ensure water quality protection measures (e.g., straw bales, silt fences and swales) are working throughout the entire Construction Phase. All containment and treatment facilities will be maintained and inspected regularly based on Site and weather conditions for any signs of contamination of excessive silt deposits and records of these checks will be maintained.

7.9.2 Operational Phase

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development. The SuDS maintenance is outlined in Section 6.4 of the Planning Application Services Report (EOBSM, 2023b). These maintenance measure include:

- Permeable paving should be regularly inspected, particularly during and after heavy rainfall to ensure effective operation. Vacuum brushing/ jetting of permeable paving should be carried out once a year.
- Underground attenuation systems , inspections of the systems to be carried out monthly for the first three months and then annually to ensure the system is working correctly. Debris to be removed monthly. The internal tank requires inspection and survey every 5 years or as required if performance is reduced.
- Bio retention , routine inspections and attention to maintenance as required to ensure bioretention basins continue to operate effectively.

7.10 Interactions

7.10.1 Population and Human Health

No public health issues associated with the water (hydrology and hydrogeology) conditions at the Proposed Development Site have been identified for the Construction Phase or Operational Phase of the Proposed Development.

It is noted that specific issues relating to Public Heath associated with the Proposed Development are set out in Chapter 4 of this EIAR.

7.10.2 Material Assets- Water

An assessment of the potential impact of the Proposed Development on the Material Assets including built services, infrastructure, traffic, and waste management has been set out in Chapter 12 of this EIAR. Any discharges to the public foul sewer and water supply to the Proposed Development will be under consent from Irish Water.

7.10.3 Land, Soils & Geology

An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment during the Operational Phase of the Proposed Development is set out in Chapter 6 Land, Soil and Geology.

7.10.4 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Proposed Development Site, with emphasis on habitats, flora and fauna which may be impacted as a result of the Proposed Development is included in Chapter 5 of this EIAR. It also assesses the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

7.11 Difficulties Encountered When Compiling

No ground investigation data was provided by the client for the completion of this chapter.

7.12 References

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8 AIR QUALITY AND CLIMATE

8.1 Introduction

This Chapter describes and assess the potential impacts on air quality and climate associated with the Proposed Development.

Considering Ambient Air Quality Standards, the baseline air quality has been examined along with the potential for release of emissions to the atmosphere and associated effects prior to and following mitigation measures. This Chapter describes and assesses the potential impacts on micro and macro-climate as a result of the Proposed Development. Attention will be focused on Ireland's obligations under the Kyoto Protocol in the context of the overall climatic impact of the presence and absence of the Proposed Development.

8.1.1 Quality Assurance and Competence

This Chapter was prepared by Laura Griffin, Environmental Consultant, Enviroguide Consulting. Laura has a Master of Science (Hons) in Climate Change from Maynooth University and a Bachelor of Arts (Hons) in English and Geography from Maynooth University. Laura has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Air Quality and Climate, Noise and Vibration, and Material Assets (Waste and Utilities) of EIARs

8.1.2 Ambient Air Quality Standards

For the protection of health and ecosystems, EU directives apply air quality standards in Ireland and other EU member states for a range of pollutants. These rules include requirements for monitoring, assessment and management of ambient air quality. The first major instrument in tackling air pollution was the Air Quality Framework Directive 96/62/EC and its four daughter Directives. Each of these instruments was repealed with the introduction of Directive 2008/50/EC on ambient air quality and cleaner air for Europe in 2008 (as amended by Decision 2011/850/EU and Directive 2015/1480/EC) (the CAFE Directive), save for the "Fourth Daughter Directive" (Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air).

The CAFE Directive lays down measures aimed at:

1) defining and establishing objectives for ambient air quality designed to avoid, prevent, or reduce harmful effects on human health and the environment as a whole;
2) assessing the ambient air quality in Member States on the basis of common methods and criteria and, in particular, assessing concentrations in ambient air of certain pollutants;
3) providing information on ambient air quality in order to help combat pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures;
4) ensuring that such information on ambient air quality is made available to the public;
5) maintaining air quality where it is good and improve it in other cases;

6) promoting increased cooperation between the Member States in reducing air pollution.

Ambient air quality monitoring and assessment in Ireland is carried out in accordance with the requirements of the CAFE Directive. The CAFE Directive has been transposed into Irish legislation by the Air Quality Standards Regulations (S.I. No. 180 of 2011). The CAFE Directive requires EU member states to designate 'Zones' reflective of population density for the purpose of managing air quality. Four zones were defined in the Air Quality Standards Regulations (2011) and subsequently amended in 2013 to account for 2011 census population counts and to align with coal restricted areas in the Air Pollution Act (Marketing, Sale, Distribution and Burning of Specified Fuels) Regulations 2012. (S.I. No. 326 of 2012) (the 2012 Regulations).

The main areas defined in each zone are:

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

The Site of the Proposed Development is located at lands at Cornamaddy & Ballykeeran, Athlone and falls under the 'Zone C' category based on the EPA CAFE Directive.

The CAFE Directive outlines certain limit or target values specified by the five published directives that apply limits to specific air pollutants. These limits, outlined in Table 8-1, will be referred to as part of the Proposed Development assessment with respect to air quality.

Table 8-1: Limit Values of Cleaner Air for Europe (CAFE) Directive 2008/50/EC (Source: EPA, 2020)

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
SO_2	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 Jan 2005
SO_2		24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO_2	Protection of vegetation	Calendar year	20	7.5	Annual mean	19 July 2001
SO_2		1 Oct to 31 Mar	20	7.5	Winter mean	19 July 2001

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO_2		Calendar year	40	21	Annual mean	1 Jan 2010
NO + NO_2	Protection of ecosystems	Calendar year	30	16	Annual mean	19 July 2001
PM10	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM10		Calendar year	40	-	Annual mean	1 Jan 2005
PM2.5 - Stage 1		Calendar year	25	-	Annual mean	1 Jan 2015
PM2.5 - Stage 2		Calendar year	20	-	Annual mean	1 Jan 2020
Lead		Calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide		8 hours	10,000	8,620	Not to be exceeded	1 Jan 2005
Benzene		Calendar year	5	1.5	Annual mean	1 Jan 2010

The EPA is the competent authority for the purpose of the CAFE Directive and is required to send an annual report to the Minister for Environment and the European Commission. The regulations further provide for the distribution of public information. This includes information on any exceedances of target values, the reasons for exceedances, the area(s) in which they occurred, and the relevant information regarding effects on human health and environmental impacts.

8.1.3 Climate Agreements

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, and extreme weather events.

In March 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was established as an intergovernmental effort to tackle the challenges posed by climate

change. The Convention membership is almost universal, with 197 countries having ratified. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices. This information is then utilised to launch national strategies and international agreements to address GHG emissions. Following the formation of the UNFCCC, two major international climate change agreements were adopted: The Kyoto Protocol, and the Paris Agreement.

In April 1994, Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) and subsequently signed the Kyoto Protocol in 1997. The Kyoto Protocol is an international agreement linked to the UNFCCC which commits its parties to legally binding emission reduction targets. To ensure compliance with the protocol, the Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. These are designed to estimate and report on national inventories of anthropogenic GHG emissions and removals. Under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six named GHGs to 13% above the 1990 level, spanning the period 2008 to 2012.

The second commitment period of the Kyoto Protocol was established by the Doha amendment which was adopted *in extremis* on the 8th of December 2012, to impose quantified emission limitation and reduction commitments (QELRCs) to Annex I (developed country) Parties during a commitment period from 2013 to 2020. 38 developed countries, inclusive of the EU and its 28 member states, are participating. Under the Doha amendment, participating countries have committed to an 18% reduction in emissions from 1990 levels. The EU has committed to reducing emissions in this period to 20% below 1990 levels. Ireland's QELRCs for the period 2013 to 2020 is 80% of its base year emissions. Ireland's compliance with the Doha amendment will be assessed based on the GHG inventory submission in 2022 for 1990-2020 data. As of October 2020, the Doha Amendment has received the required number of ratifications to enter into force. Once in force, the emission reduction commitments of participating developed countries and economies in transition (EITs) become legally binding.

In December 2015, the Paris Climate Change Conference (COP21) took place and was an important milestone in terms of international climate change agreements. The Paris Agreement sets out a global action plan to put the world on track to mitigate dangerous climate change by setting a global warming limit not to exceed 2°C above pre-industrial levels, with efforts to limit this to 1.5°C. As a contribution to the objectives of the agreement, countries have submitted comprehensive national climate action plans (nationally determined contributions, NDCs). Under this agreement, governments agreed to come together every 5 years to assess the collective progress towards the long-term goals and inform Parties in updating and enhancing their nationally determined contributions. Ireland will contribute to the Agreement through the NDC tabled by the EU on behalf of Member States in 2020, which commits to a 55% reduction in EU-wide emissions by 2030 compared to 1990. This is considered to be the current NDC maintained by the EU and its Member States under Article 4 of the Paris Agreement.

The EU has set itself targets for reducing its GHG emissions progressively up to 2050, these are outlined in the 2020 climate and energy package and the 2030 climate and energy policy framework. These targets are defined to assist the EU in transitioning to a low-carbon economy, as detailed in the 2050 low carbon roadmap. The 2020 package is a set of binding

legislation to ensure that the EU meets its climate and energy targets for the year 2020. There are three key targets outlined in the package which were set by the EU in 2007 and enacted in legislation in 2009:

- 20% reduction in GHG emissions from 1990 levels;
- 20% of EU energy to be from renewable sources;
- 20% improvement in energy efficiency.

The 2030 climate and energy framework builds on the 2020 climate energy package and was adopted by EU leaders in October 2014. The framework sets three key targets for the year 2030:

- At least 40% cuts in GHG emissions from 1990 levels;
- At least 32% share for renewable energy;
- At least 32.5% improvement in energy efficiency.

The EU has acted in several areas to meet these targets, including the introduction of the Emissions Trading System (ETS). The ETS is the key tool used by the EU in cutting GHG emissions from large-scale facilities in the power, industrial, and aviation sectors. Around 45% of the EU's GHG emissions are covered by the ETS.

As part of the European Green Deal, the Commission proposed in September 2020 to raise the 2030 greenhouse gas emission reduction target, including emissions and removals, to at least 55% compared to 1990. The European Climate Law came into force in July 2021 and writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

8.1.3.1 National Policy Position and Greenhouse Gas Emissions in Ireland

National climate policy in Ireland recognises the threat of climate change to humanity and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future. A fundamental national objective aims to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050.

The Climate Action Plan 2023 (CAP23) is the second annual update to Ireland's Climate Action 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings.

The plan was launched on 21 December 2022. The supplementary Annex of Actions will be published early in 2023.

The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. Climate Action Plan 2023 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

Ireland's latest greenhouse gas (GHG) emissions 1990-2021 are provisional figures based on the SEAI's final energy balance released in June 2022 (EPA, 2022). In 2021, Ireland's GHG emissions are estimated to be 61.53 million tonnes carbon dioxide equivalent (Mt CO_2eq), which is 4.7% higher (or 2.76 Mt CO_2eq) than emissions in 2020 (58.77 Mt CO_2eq). There was a decrease of 3.4% in emissions reported for 2020 compared to 2019. Emissions are over 1% higher than pre-pandemic 2019 figures.

In 2021, national total emissions excluding Land Use, Land Use Change and Forestry (LULUCF) increased by 4.7%, emissions in the stationary ETS sector increased by 15.2% and emissions under the ESR (Effort Sharing Regulation) increased by 1.6%. When LULUCF is included, total national emissions increased by 5.5%. The energy industries, transport and agriculture sectors accounted for 71.9% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 37.5%. Transport, energy industries and the residential sector are the next largest contributors, at 17.7%, 16.7% and 11.4%, respectively (EPA, 2022).

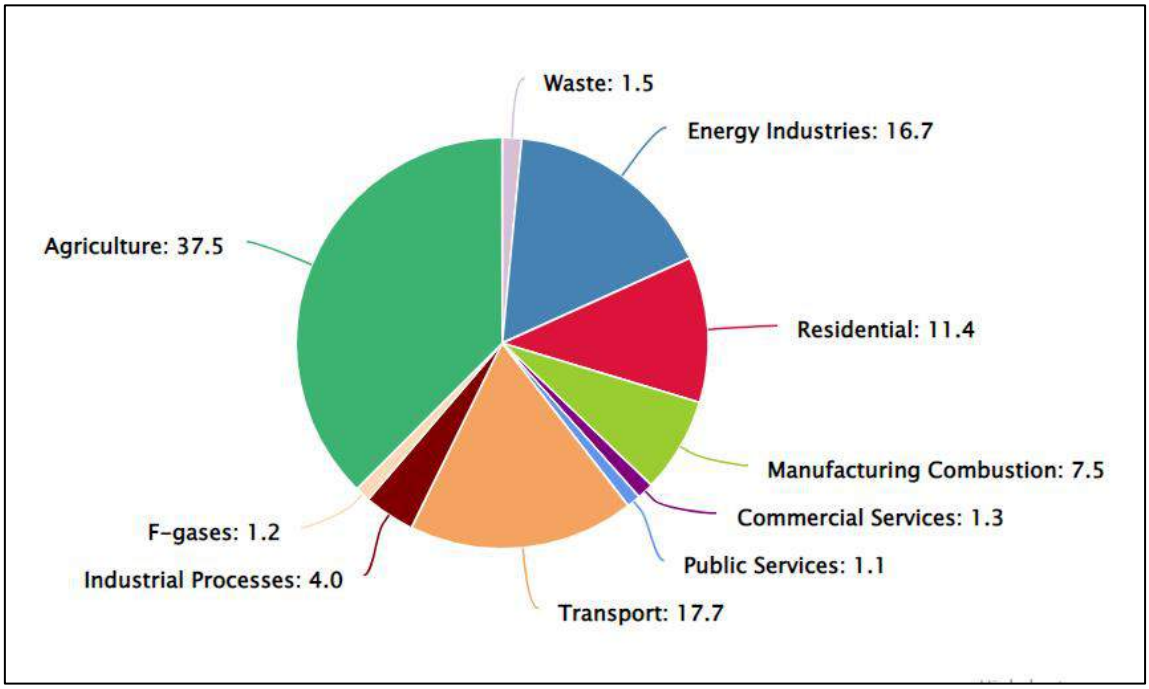

Figure 8-1: Ireland's Greenhouse Gas Emissions by Sector for 2021 (Source: EPA, 2022)

8.2 Study Methodology

Considering Ambient Air Quality Standards, the baseline air quality of the site will be examined using EPA monitoring data. Air quality impacts from the Proposed Development will then be determined by a qualitative assessment of the nature and scale of dust generating activities associated with the construction phase of the project in accordance with relevant guidance (Transport Infrastructure Ireland (TII) 2011 Appendix 8; Institute of Air Quality Management (IAQM) 2014).

Impacts from the Construction Phase traffic has been assessed using information from the Traffic Chapter and following the relevant guidance (TII, 2011; HA, 2007; EPA; UK DEFRA; IAQM).

Operational Phase traffic impact assessment will involve air dispersion modelling using the UK Design Manual for Roads and Bridges Screening Model (DMRB, UK Highways Agency 2007) (Version 1.03c), the NO_x to NO_2 Conversion Spreadsheet (UK Department for Environment, Food and Rural Affairs, 2017), and following all relevant guidance (TII, 2011; HA, 2007; EPA; UK DEFRA; IAQM).

A desktop study involving various national and international documents on climate change and analysis of synoptic meteorological data from the nearest Met Eireann station was also carried out in order to compile this chapter. Attention will be focused on Ireland's obligations under the Kyoto Protocol (including the Doha Amendment) and the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

8.3 The Existing and Receiving Environment (Baseline Situation)

The Site of the Proposed Development is located at Ballykeeran Gardens, Cornamaddy, Athlone, Co. Westmeath. The site is bound to the south and west by agricultural fields, to the north by an unnamed local road and to the east by Blyry Court.

8.3.1 Air Quality

According to the 2012 Regulations (S.I. No. 326 of 2012) the proposed site falls into 'Zone C' of Ireland which is described by the EPA as 'Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise'. It is expected that existing ambient air quality in the vicinity of the site is characteristic of a suburban location with the primary source of air emissions such as particulate matter, NO_2, and hydrocarbons likely to be of traffic, aviation, industrial activities, combustion and agriculture, and domestic fuel burning.

In conjunction with individual local authorities, the EPA undertakes ambient air quality monitoring at specific locations throughout the country in the urban and rural environment; an Air Quality Report based on data from monitoring stations and a number of mobile air quality units is developed on an annual basis. The EPA's most recent publication 'Air Quality in Ireland, 2021' reports the quality of the air in Ireland based on the data from the National Ambient Air Quality Monitoring Network throughout the year 2021.

When assessing air quality, the EPA focuses on two main pollutants: particulate matter and nitrogen oxides. Measured concentrations of NO_2 for the years 2020 and 2021 are presented in Table 8-2 for Zone C monitoring stations. These results show that current levels of NO_2 are well below the annual mean and 1-hour maximum limit values. In the year 2020, annual mean concentrations of NO_2 ranged from 4 - 19 ug/m^3 across all Zone C stations, with no exceedance of the maximum hourly limit (EPA, 2021). In the year 2021, annual mean concentrations of NO_2 ranged from 4.2 - 21.9 ug/m^3 across all Zone C stations, with no exceedance of the maximum hourly limit (EPA, 2022).

During 2020, the restriction of movement in Ireland due to the COVID-19 Pandemic had an impact on air quality nationally with a large-scale reduction in vehicular traffic. It is noted that

the decrease in NO_2 levels during that year is a direct result of the restrictions placed on movements and construction due to COVID-19.

Based on the EPA data, a conservative estimate of the current background NO_2 concentration in the region of the Proposed Development is 12 µg/m^3.

Table 8-2: Mean Concentrations of NO_2 at Zone C Monitoring Stations

Station	Objective	Concentration		Limit or Threshold Value
		2020	2021	
Meath Navan	Annual Mean NO_2	19	21.9	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Waterford Brownes Road	Annual Mean NO_2	7	6.6	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Sligo	Annual Mean NO_2	17	16.6	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Limerick People's Park	Annual Mean NO_2	10	9.8	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Limerick Henry Street	Annual Mean NO_2	-	14	40 µg/m3
	Days > 200 µg/m^3	-	0	35 Days
Kilkenny Seville Lodge	Annual Mean NO_2	4	4.2	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Portlaoise	Annual Mean NO_2	11	7.9	40 µg/m3
	Days > 200 µg/m^3	0	0	35 Days
Dundalk	Annual Mean NO_2	10	10.733341	40 µg/m3
	Days > 200 µg/m^3	1	0	35 Days

Measured concentrations of PM_{10} for the years 2020 and 2021 are presented in Table 9-3 for Zone C monitoring stations. As is evident from these results, current levels of PM_{10} are well below the annual mean limit value. In the year 2020, annual mean concentrations of PM_{10} ranged from 11 – 20 ug/m^3 across all Zone C stations, with no exceedance of short-term limit values (EPA, 2021). In the year 2021, annual mean concentrations of PM_{10} ranged from 10.4 – 19 ug/m^3 across all Zone C stations, with no exceedance of short-term limit values (EPA, 2022).

The nearest air monitoring station which measures PM_{10} is Athlone monitoring station (ca. 2.6km southwest of the site) and therefore is broadly representative of background

concentrations in the vicinity of the Proposed Development. Concentrations of PM_{10} at Athlone monitoring station are well below their respective limit values in 2020 and 2021, with an annual mean of 16 ug/m^3 and 17.1 ug/m^3, respectively, and with no exceedances of the PM_{10} daily limit for the protection of human health (EPA, 2021; EPA, 2022).

Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the Proposed Development is 16.55 µg/m^3.

Table 8-3: Mean Concentrations of PM_{10} at Zone C Monitoring Stations

Station	Objective	Concentration		Limit or Threshold Value
		2020	2021	
Portlaoise	Annual Mean PM_{10}	12	11.4	40 µg/m3
	Days > 50 µg/m^3	0	1	35 Days
Ennis	Annual Mean PM_{10}	20	19	40 µg/m3
	Days > 50 µg/m^3	19	17	35 Days
Sligo	Annual Mean PM_{10}	16	18.3	40 µg/m3
	Days > 50 µg/m^3	2	20	35 Days
Galway Rahoon	Annual Mean PM_{10}	13	11.4	40 µg/m3
	Days > 50 µg/m^3	1	1	35 Days
Clonmel	Annual Mean PM_{10}	12	10.6	40 µg/m3
	Days > 50 µg/m^3	1	0	35 Days
Dundalk	Annual Mean PM_{10}	13	11.7	40 µg/m3
	Days > 50 µg/m^3	2	0	35 Days
Carlow Town	Annual Mean PM_{10}	11	10.4	40 µg/m3
	Days > 50 µg/m^3	1	0	35 Days
Waterford Browne's Road	Annual Mean PM_{10}	14	13.7	40 µg/m3
	Days > 50 µg/m^3	3	2	35 Days
Navan	Annual Mean PM_{10}	14	13.5	40 µg/m3
	Days > 50 µg/m^3	0	9	35 Days
Kilkenny Seville Lodge	Annual Mean PM_{10}	19	16.7	40 µg/m3
	Days > 50 µg/m^3	1	2	35 Days
Letterkenny	Annual Mean PM_{10}	15	14.7	40 µg/m3

Station	Objective	Concentration		Limit or Threshold Value
		2020	2021	
	Days > 50 µg/m^3	9	0	35 Days
Wexford Town	Annual Mean PM_{10}	12	13.5	40 µg/m3
	Days > 50 µg/m^3	0	2	35 Days
Limerick Henry Street	Annual Mean PM_{10}	-	11.1	40 µg/m3
	Days > 50 µg/m^3	-	0	35 Days
Limerick People's Park	Annual Mean PM_{10}	13	12.6	40 µg/m3
	Days > 50 µg/m^3	1	2	35 Days
Athlone	Annual Mean PM_{10}	16	12.1	40 µg/m3
	Days > 50 µg/m^3	3	2	35 Days
Tralee	Annual Mean PM_{10}	16	17.1	40 µg/m3
		7	10	35 Days
Drogheda	Days > 50 µg/m^3	-	10.7	40 µg/m3
		-	0	35 Days
Naas	Annual Mean PM_{10}	-	10.5	40 µg/m3
	Days > 50 µg/m^3	-	0	35 Days
Greystones	Annual Mean PM_{10}	-	9.7	40 µg/m3
	Days > 50 µg/m^3	-	0	35 Days

8.3.2 Macroclimate

Ireland has a typical maritime climate, largely due to its proximity to the Atlantic Ocean and the presence of the Gulf Stream. Due to the moderating effects of the Gulf Stream, Ireland does not suffer the temperature extremes that are experienced by many other countries at a similar latitude. Mean annual temperatures generally range between 9ºC and 10ºC. Winters tend to be cool and windy while summers are mostly mild and less windy. The prevailing wind direction is between the south and west with average annual wind speeds ranging between 6 knots in parts of south Leinster to over 15 knots in the extreme north. Rainfall in Ireland occurs throughout the year with reasonable frequency. The highest rainfall occurs in the western half of the country and on high ground, and generally decreases towards the northeast. As the prevailing winds are from the west-southwest, the west of Ireland experiences the largest number of wet days. The area of least precipitation is along the eastern seaboard of the country.

8.3.3 Microclimate

The synoptic meteorological station at Mullingar is located approximately 37km northeast of the Proposed Development; and for the purposes of this chapter, weather data collected here may be considered similar to that which is experienced in the surrounding area of the site.

The weather in the local area is generally dominated by cool oceanic air masses, with cool winters, mild humid summers, and a lack of temperature extremes. Based on meteorological data at Mullingar over the last 3 years, the mean January temperature is 4.6ºC, while the mean July temperature is 15.8ºC. The prevailing wind direction is from a quadrant centred on the southwest. These are moderately warm winds from the Atlantic and they habitually bring rain. The average annual rainfall in Cork is 1050.1mm. Easterly winds are less frequent, weaker, and tend to bring cooler weather from the northeast in spring and warmer weather from the southeast in summer.

8.3.3.1 Rainfall

Rainfall is a key indicator of changes in climate, as measurements of rainfall are fundamental to assessing the effects of climate change on the water cycle and water balance. Table 8-4 illustrates the monthly and annual rainfall data collected over a 3-year period (2020-2022) at Mullingar Weather Station. The annual rates of precipitation ranged from 980.8mm in 2021 to 1078.9mm in 2020 with distribution of the highest monthly rainfall values falling mainly in the autumn and winter months. This is broadly within the expected range of the midlands.

Table 8-4: Monthly Rainfall Values (mm) for Mullingar Weather Station from January 2020 to December 2022 (Source: Met Eireann)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2022	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35,2	104.1	208.8	109.3	84.5	**1001.8**
2021	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128.0	**980.8**
2020	54.4	197.5	61.0	41.9	10.1	96.6	126.3	114.0	68.3	131.8	87.7	89.3	**1078.9**
LTA	**92.5**	**70.3**	**76.6**	**65.9**	**69.2**	**73.8**	**71.1**	**86.1**	**78.3**	**104.3**	**88.1**	**95.7**	**970.9**

8.3.3.2 Wind

Wind at a particular location can be influenced by several factors, such as obstructions by trees or buildings, the nature of the terrain, and deflection by nearby mountains or hills. Wind blows most frequently from the south and west for open sites while winds from the northeast and north occur less often. The analysis of hourly weather data from Mullingar synoptic weather station over a period of 30 years suggests that the predominant wind direction blows from the southwest, with windspeeds of between 7 and 10 knots occurring most frequently.

Figure 8-2 provides a wind speed frequency distribution which represents wind speed classes and the frequency at which they occur (% of time) at Mullingar weather station over a period of 30 years. Wind speeds of 5 knots have the highest frequency, occurring approximately 11% of the time.

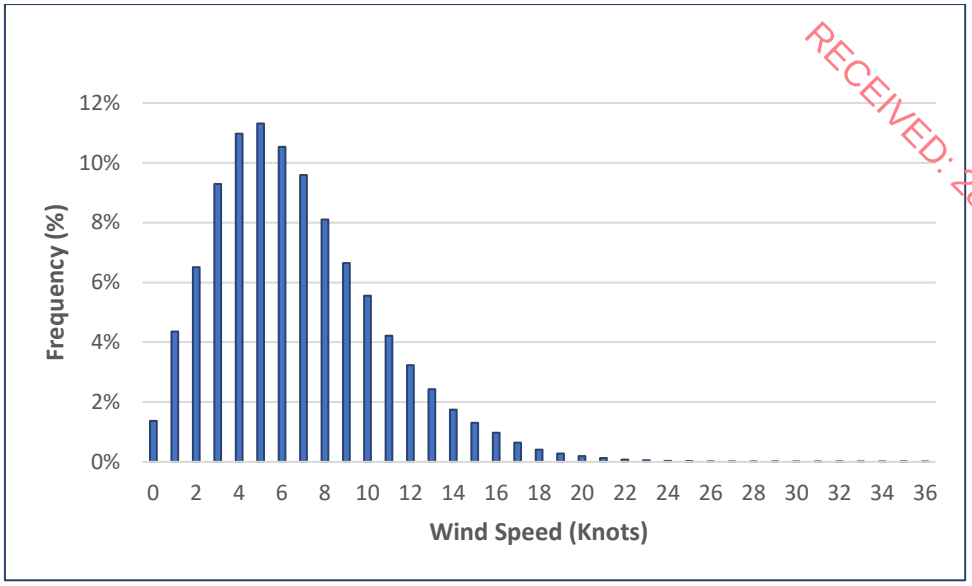

Figure 8-2: Wind Speed Frequency Distribution at Mullingar Synoptic Weather Station over 30 years (1992-2021)

Figure 8-3 provides a wind rose of the predominant wind directions and associated wind speeds at Mullingar Synoptic weather station. As is visible from Figure 3, the prevailing wind is from a south-westerly direction with an annual incidence of 28.35% for winds between 200 and 250 degrees. The most frequent wind speed associated with this wind direction is between 7 and 10 knots which is considered a 'gentle breeze' in terms of the Beaufort scale, this wind direction and wind speed occurs in combination approximately 9.97% of the time. The overall most common windspeed is also between 4 and 6 knots, occurring in 32.81% of incidences, and wind speeds of between 7 and 10 knots occurring in 29.89% of incidences.

The lowest frequency is for winds blowing from the northern quadrant at approximately 3.84% of the time. Wind speeds of above 11 knots (5.66m/s) occurring in just 15.75% of incidences. This wind rose is broadly representative of the prevailing conditions experienced at the subject site.

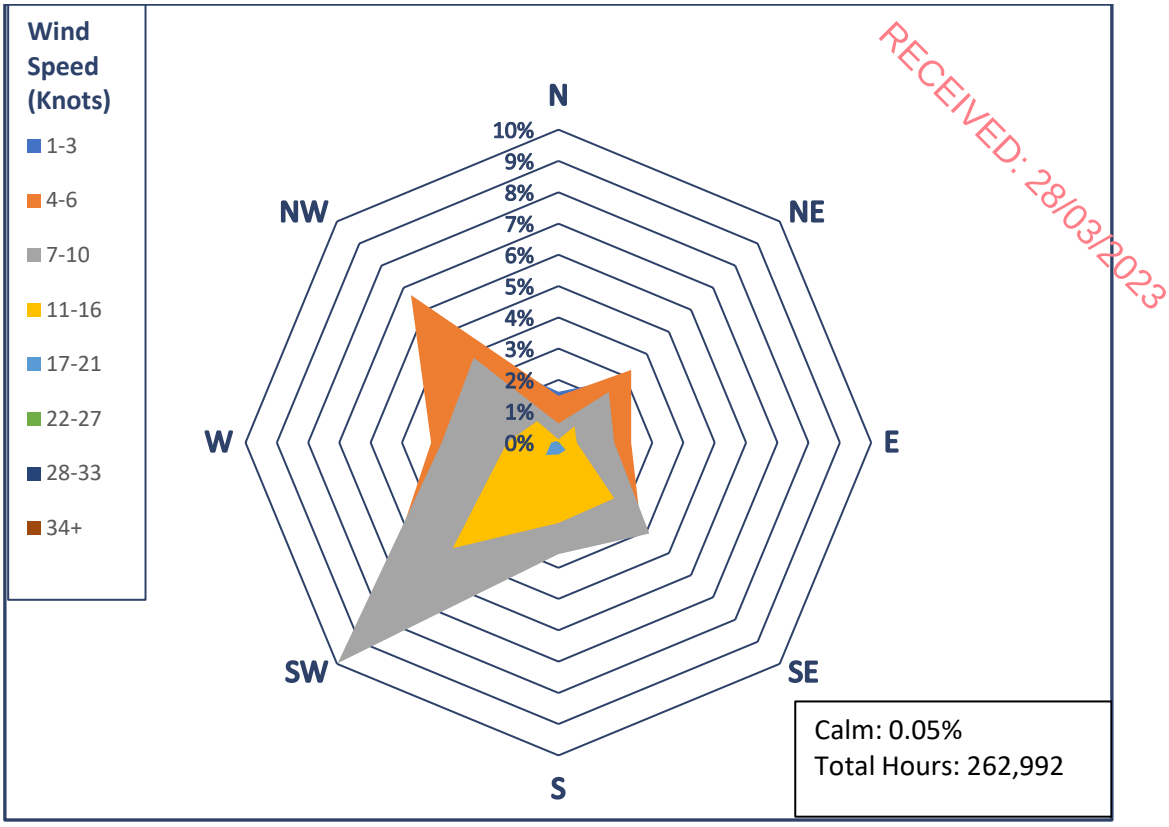

Figure 8-3: 30-year Windrose at Mullingar Synoptic Weather Station 1992-2021 (Developed using Met Eireann Hourly Data)

8.4 Characteristics of the Proposed Development

The Proposed Development will consist of the provision of a total of 332 no. residential units along with provision of a creche. See Chapter 2 for a description of the components of the Proposed Development. The Proposed Development will comply with the Building Regulations Part L 2019, Buildings Other Than Dwellings. As part of the development's efforts to reduce energy consumption, the Proposed Development is targeting an A3 BER (Building Energy Rating) throughout.

8.5 Potential Impact of the Proposed Development

8.5.1 Potential Impacts on Air Quality

8.5.1.1 Construction Phase

There is potential for construction related air emissions to impact on local air quality as a result of the Proposed Development. Potential impacts are expected to be short-term and of a temporary nature. The main air quality impacts that may arise during construction activities are:

- Dust deposition;

- Elevated particulate matter concentrations (PM_{10} and $PM_{2.5}$) as a result of dust generating activities on site; and
- An increase in concentrations of airborne particles, volatile organic compounds, nitrogen oxides, and sulphur oxides due to exhaust emissions from diesel-powered vehicles and equipment on site (non-road mobile machinery) and vehicles accessing the site.

The greatest potential impact on air quality during this phase is from construction dust emissions and the potential for nuisance dust. The dust emissions from a construction site that may result in air quality impacts generally depend on:

- Site activities and duration;
- The size of the site;
- The meteorological conditions;
- The proximity of receptors to the activities;
- The adequacy of applied mitigation measures; and
- The sensitivity of receptors to dust.

The primary sources of dust identified include soil excavation works, demolition, bulk material transportation, loading and unloading, stockpiling materials, cutting and filling, and vehicular movements (HGVs and on-site machinery).

According to Transport Infrastructure Ireland guidelines (TII, 2011), it is difficult to accurately quantify dust emissions arising from construction activities. Therefore, it is not possible to easily predict changes to dust soiling rates or PM_{10} concentrations. TII recommend a semi-quantitative approach to determine the likelihood of significant impact in this instance. This should also be combined with an assessment of the proposed mitigation measures. The following table outlines the distance criteria which is recommended for use in assisting a semi-quantitative assessment:

Table 8-5: Assessment Criteria for the Impact of Dust Emissions from Construction Activities, with Standard Mitigation in Place

Source		**Potential Distance for Significant Effects (Distance from source)**		
Scale	Description	Soiling	PM10	Vegetation effects
Major	Large construction sites, with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites, with	50m	15m	15m

	moderate use of haul routes			
Minor	Minor construction sites, with limited use of haul routes	25m	10m	10m

To account for a worst-case scenario, the Proposed Development can be considered major in scale due to the size of the site and the duration of construction activities. Therefore, it can be assumed that there is potential for significant dust soiling 100m from the site.

There are a number of high-sensitivity receptors (residential dwellings) located within 100m of the site boundary; these are situated to the north, west, south and east of the Proposed Development Site. Therefore, in the absence of mitigation, it is considered that there is potential for dust impacts to occur at these locations. Sensitive receptors within 100m of the Proposed Development are identified in Table 9-6:

Table 8-6: Sensitive Receptors

Name	Type	Coordinates		Orientation Relative to the Site Boundary
		X	Y	
Clonagh	Residential	53.441618	-7.905437	20m North
Clonagh	Residential	53.441613	-7.906701	20m West
Clonagh	Residential	53.440220	-7.902083	60m North
Cornamaddy	Residential	53.437497	-7.903058	20m South
Drumaconn	Residential	53.436621	-7.905391	60m South
Cornamaddy	Residential	53.437655	-7.900178	60m East

According to IAQM Guidance (2016), the primary factor influencing the Pathway is the distance between the sensitive receptor and the dust sources. However, other factors can cause a higher or a lower category to be assigned then would be the case based on distance alone. These factors include:

- Orientation of receptors relative to the prevailing wind direction; and
- Topography, terrain, and physical features.

Meteorological conditions greatly affect the level of dust emissions and subsequent deposition downwind of the source; the most predominant being rainfall and wind speed. Adverse impacts can occur in any direction from a site; however, they are more likely to occur downwind of the prevailing wind direction and/or close to the site. Relatively high levels of moisture in the surrounding air, soils, and precipitation helps to suppress dust due to the cohesive properties of water between dust particles. The least favourable meteorological conditions for dust generation would typically be warm days with strong winds and low precipitation. Due to the variability of weather, it is impossible to predict the conditions that will occur during the

Construction Phase of the development. However, wind direction is most likely to prevail from the southwest.

Table 8-7 outlines the hourly percentage distribution of wind speed and direction at Mullingar Airport synoptic weather station over a 30-year period (1992-2021). This data is consistent with Figure 8-3 of this chapter and shows that the most frequent wind direction prevails from the southwest (28.35% frequency). The corresponding most frequent wind speed is between 4 and 6 knots which is considered a 'light breeze' in terms of the Beaufort scale; this wind direction and wind speed occurs in combination approximately 8.60% of the time.

Table 8-7: Percentage of Wind Speeds and Direction at Mullingar Synoptic Weather Station 1992-2021

Wind Speeds (Knots)		<1	1-3	4-6	7-10	11-16	17-21	22-27	28-33	34+	% Dry Days
Wind Direction	Degrees										
North	350-10	0.05	1.63	1.50	0.61	0.10	0.00	0.00	0.00	0.00	31%
North-east	20-70		2.78	3.29	2.28	0.73	0.02	0.00	0.00	0.00	
East	80-100		1.54	2.32	1.78	0.58	0.04	0.01	0.00	0.00	
South-east	110-150		2.05	3.72	4.11	2.52	0.33	0.03	0.00	0.00	
South	170-190		1.48	2.65	3.56	2.57	0.38	0.05	0.00	0.00	
South-west	200-250		4.36	8.60	9.97	4.78	1.65	0.07	0.01	0.00	
West	260-280		1.99	4.07	3.73	1.65	0.23	0.02	0.00	0.00	
North-west	290-340		4.19	6.67	3.83	0.97	0.07	0.01	0.00	0.00	

Dry days with moderate to high windspeeds (above 5m/s (7-10 knots)) are the conditions which are most likely to result in fugitive dust emissions. Sensitive receptors within 100m of the Proposed Development have been identified a series of residential dwellings which are located to the north, west, east, and south of the site.

Receptors located to the south of the site would require prevailing winds from the north to be potentially impacted by fugitive dust emissions. At these receptors, the frequency of winds (>5m/s) occurring from the direction of the dust source on dry days is 0.22%. Receptors located to the north of the site would require prevailing winds from the south to be potentially impacted by fugitive dust emissions. At these receptors, the frequency of winds (>5m/s) occurring from the direction of the dust source on dry days is 2%. Receptors located to the west of the site would require prevailing winds from the east to be potentially impacted by fugitive dust emissions. At these receptors, the frequency of winds (>5m/s) occurring from the direction of the dust source on dry days is 0.75%. Receptors located to the east of the site would require prevailing winds from the west to be potentially impacted by fugitive dust emissions. At these receptors, the frequency of winds (>5m/s) occurring from the direction of the dust source on dry days is 1.75%. Therefore, appropriate conditions for fugitive dust

emissions at these receptors are highly infrequent and it is expected that adequate mitigation measures, as outlined in Section 8.6.1, will prevent nuisance dust from resulting in any adverse impacts.

Construction vehicles and machinery during this phase will temporarily and intermittently generate exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur oxides, and particulate matter (dust). Dust emissions associated with vehicular movements are largely due to the resuspension of particulate materials from ground disturbance. According to the IAQM (2014), experience from the assessment of exhaust emissions from on-site machinery and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. Air pollutants may increase marginally due to construction-related traffic and machinery from the Proposed Development. However, any such increase is not considered significant and will be well within relevant ambient air quality standards. According to TII (2011), the significance of impacts due to vehicle emissions during the Construction Phase will be dependent on the number of additional vehicle movements, the proportion of HGVs and the proximity of sensitive receptors to site access routes. If construction traffic would lead to a significant change (> 10%) in Annual Average Daily Traffic (AADT) flows near to sensitive receptors, then concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ should be predicted in line with the methodology as outlined within TII guidance. Construction traffic is not expected to result in a significant change (> 10%) in AADT flows near to sensitive receptors, then concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ should be predicted in line with the methodology as outlined within TII guidance. The assessment of potential traffic impacts has been completed within Volume 3, *Traffic*. Construction traffic is expected to exceed 10% of the traffic flow on the adjoining roads; therefore, concentrations of NO_2 and PM_{10} have been predicted in the Opening Year (2027) in the following section 8.5.1.2.

8.5.1.2 Operational Phase

The greatest potential effect on air quality during the Operational Phase of the Proposed Development is from traffic-related air emissions. The Proposed Development will comply with the Building Regulations Part L 2019, Buildings Other Than Dwellings. As part of the development's efforts to reduce energy consumption, the Proposed Development is targeting an A3 BER (Building Energy Rating) throughout. It is predicted that fossil fuel combustion gas emissions including carbon dioxide, sulphur dioxide, nitrogen oxides, carbon monoxide and hydrocarbon particulate emissions will be minor and ongoing for the life of the development and will not have an adverse significant impact on the existing ambient air quality in the vicinity of the Site.

Operational traffic will use regional and local roads to access the facility with potential increases of traffic flow on some roads and subsequent associated emissions of VOCs, nitrogen oxides, sulphur dioxides and increased particulate matter concentrations.

In terms of associated impacts on air quality, Table 8-8 outlines the criteria that are prerequisite for an air quality assessment:

Table 8-8: Indicative Criteria for Requiring an Air Quality Assessment (Source: IAQM, 2017)

Potential Change resulting from Proposed Development	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	A change of LDV flows of more than 1000 Annual Average Daily Traffic (AADT)
Cause a significant change in Heavy Duty Vehicle (HGV) flows on local roads with relevant receptors	A change of HGV flows of more than 100 Annual Average Daily Traffic (AADT)
Realign roads, i.e., changing the proximity of receptors to traffic lanes	Where the change is 5m or more
Cause a change in Daily Average Speed (DAS)	Where the DAS will change by 10 km/h or more
Cause a change in peak hour speed	Where the peak hour speed will change by 20km/h or more.

The UK Highways Agency Design Manual for Roads and Bridges (DMRB) air quality guidance (LA 105) provides a framework for assessing, mitigating, and reporting the effects of road schemes on air quality; however, this can be adapted to any development which results in a change in traffic.

The criteria as set out in Table 8-9 have been used to determine the project's risk potential to the receiving environment, and whether a simple or detailed air quality assessment is required:

Table 8-9: Receiving Environment Sensitivity (Source: DMRA LA 105)

Sensitivity	Features of receiving environment
High	1) Large number of receptors (human and / or ecological) within 50m of roads triggering traffic screening criteria; 2) Baseline monitoring data indicates concentrations above the AQS Objective / EU limit value; 3) Monitoring indicates exceedances of short term AQS Objectives / EU limit value; 4) Projecting forward monitored concentrations to the opening year, indicates exceedances of AQS Objectives / EU limit value; 5) AQMAs or reported EU limit value exceedances within project's study area.
Medium	1) Receptors (human or ecological) within 50m of roads triggering traffic change criteria; 2) Baseline monitoring data illustrates annual mean NO2 concentrations >36µg/m³;

Sensitivity	Features of receiving environment
	3) Projections indicate annual mean NO2 concentrations>36µg/m³ in opening year; 4) AQMAs or EU limit value exceedances within project's study area.
Low	1) Few receptors located close to roads triggering traffic change criteria; 2) Baseline monitoring data illustrates concentrations in base year below an annual mean of 36µg/m³; 3) No AQMAs or EU limit value exceedances within project's study area.

As outlined in the following sections, there are a number of high-sensitivity receptors located within 200m of the affected road network. However, baseline pollutant concentrations are well below an annual mean of 36 µg/m³ and there are no exceedances of EU limit values within the study area. Therefore, in accordance with Table 8-9, it is considered that the receiving environment of the Proposed Development is of a 'Low Sensitivity' and the inclusion of the Proposed Development can be considered low risk. Therefore, in line with DMRB LA 105 guidance, it has been determined that simple air quality assessment is required in this case.

8.5.1.2.1 UK Design Manual for Roads and Bridges Screening Model (V. 103c 2007)

The impact of the Operational Phase of the Proposed Development has been assessed by use of the UK DMRB screening model (Version 1.03c 2007). The DMRB screening model provides a simple and straightforward means of predicting pollutant concentrations associated with road traffic emissions from the Proposed Development. According to Transport Infrastructure Ireland Guidelines (TII, 2011), this method is a suitable approach in circumstances where the predicted environmental concentrations (i.e., ambient background + predicted concentration) lie sufficiently below the air quality standards (<90% of the standard). Where predicted concentrations approach or exceed the air quality standards/limit values, a detailed air quality assessment must be carried out.

The DMRB modelling tool requires the following inputs to complete the assessment: road types, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual traffic speeds and background pollutant concentrations. This input data is utilised by the model in predicting the Proposed Development's road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptor. The DMRB modelling tool predicts annual mean concentrations of NO_x and PM_{10}. The road NO_x concentration is then converted to NO_2 using the latest-available version of the UK Department for Environment, Food and Rural Affairs (DEFRA) NO_x to NO_2 conversion spreadsheet (version 8.1). Concentrations of carbon monoxide (CO) and benzene (Bz) are consistently and significantly below their air quality limit values, even in urban centres, therefore modelling of these pollutants is no longer necessary (EPA Annual Air Quality Reports).

As the tool does not account for electric or hybrid vehicle use, vehicle emissions applied in this study are likely to overestimate the actual vehicle emissions experienced from the Proposed Development. The worst-case contributions predicted by the tool are added to the

existing background concentration to provide a worst-case predicted ambient concentration. The compliance of the Proposed Development with the relevant ambient air quality standards is subsequently assessed by comparison with the worst-case ambient concentrations.

8.5.1.2.1.1 Sensitive Receptors

TII (2011) define sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres, and shopping areas, i.e., locations where members of the public are likely to be regularly present. According to the DMRB LA 105 guidance, sensitive receptors shall be chosen within 200m of the Affected Road Network (ARN) and include residential properties, schools and hospitals for the assessment of annual mean air quality thresholds. Where there is a risk of the short-term air quality thresholds being exceeded, then sensitive receptor locations including gardens and playing fields shall be assessed. In the current assessment, a number of high-sensitivity receptors such as residential properties and schools were identified within 200m of the ARN.

According to the DMRB LA 105 guidance, it is not necessary to model all receptors within 200m or an excessive number of receptors in the same area to determine whether there is likely to be any exceedances in the do nothing or do something scenarios.

For the purpose of determining local air quality impacts, nine (9 No.) receptors were included in this modelling assessment, and these have been identified in Table 8-10. The receptors modelled will represent the worst-case locations in the vicinity the Proposed Development and were chosen based on proximity (within 200m) to the road links affected by the Proposed Development:

Table 8-10: Sensitive Receptors

Name	Type	ITM Coordinates	
		X	Y
R1	Residential	605777	742626
R2	Residential	606193	742627
R3	Residential	606388	742825
R4	Cornamaddy National School	606477	742813
R5	Residential	606611	742645
R6	Residential	606506	742879
R7	Residential	606637	743069
R8	Residential	607157	743249
R9	Residential	606282	742949

Designated sites of ecological conservation importance within 200m of the ARN are required to be included in the air quality assessment. This includes Special Protection Areas, Special Areas of Conservation, Natural Heritage Areas, and nature reserves. Only sites that are sensitive to nitrogen deposition should be included in the assessment, it is not necessary to include sites such as those which have been designated as a geological feature or water

course. No Sites of ecological conservation importance have been identified within 200m of the ARN; therefore, this analysis has been excluded in the current assessment.

8.5.1.2.1.2 Traffic Data

The traffic data used in this assessment has been provided by Roadplan Consulting Limited and is shown in Table 8-11. The threshold is only exceeded on two of the roads (R916 and L8048), therefore a detailed air quality assessment is only required for the R916 and L8048. However, in order to complete a more comprehensive assessment of the impact of the Proposed Development on local air quality, all roads have been included in the assessment. Additionally, the Design Year (2042) "Do Something" Scenario includes the AADTs for a proposed development (Ref. 22/577) which has not yet been permitted.

Table 8-11: Traffic Data Applied to the DMRB Model

Link Number	Road Name	Base Year (2022)	Opening Year (2027)		Design Year (2042)		Speed (Km/h)
			Do Nothing	Do Something	Do Nothing	Do Something	
		AADT	AADT	AADT	AADT	AADT	
1	N55 (North)	13,288 (4.5% HGV)	14,201 (4.5% HGV)	14,392 (4.5% HGV)	15,322 (4.5% HGV)	16,221 (4.5% HGV)	50
2	N55 (South)	10,737 (4.5% HGV)	11,475 (4.5% HGV)	11,629 (4.5% HGV)	12,234 (4.5% HGV)	13,107 (4.5% HGV)	50
3	R916	8,583 (2.8% HGV)	9,149 (2.8% HGV)	9,711 (2.8% HGV)	9,870 (2.8% HGV)	12,095 (2.8% HGV)	50
4	L8048	482 (1% HGV)	514 (1% HGV)	554 (1% HGV)	554 (1% HGV)	6,412 (1% HGV)	50

8.5.1.2.1.3 Pollutants and Background Concentrations

The DMRB modelling tool predicts annual mean concentrations of NO_x and PM_{10}. The road NO_x concentration has then been converted to NO_2 using the latest published version of DEFRA's NO_x to NO_2 conversion spreadsheet (version 8.1). Concentrations of carbon monoxide (CO), and benzene (Bz) are consistently and significantly below their air quality limit values, even in urban centres, therefore modelling of these pollutants is no longer necessary (EPA Annual Air Quality Reports). According to the DMRB LA 105 guidance, it is only necessary to model PM_{10} for the base year to demonstrate that there is no impact on achievements of the PM_{10} air quality thresholds as a result of the project. Where air quality monitoring indicates exceedances of the PM_{10} air quality thresholds in the base year, PM_{10} should then be included in the model for both the 'do nothing' and 'do something' scenarios. As Ireland currently meets its legal requirements for the achievement of the $PM_{2.5}$ air quality thresholds, there is no requirement to model this parameter. Additionally, the modelling of PM_{10} can be used to demonstrate that the project does not impact on the $PM_{2.5}$ air quality threshold.

Annual mean of NO_2 and PM_{10} for the years 2020 and 2021 have been obtained for Zone C stations (see Section 8.3.1). For both parameters, annual limits are well below the threshold limits contained within the regulations.

Background concentrations for the Opening Year (2025) and Design Year (2042) have been predicted for the air quality assessment. Baseline year (2022) background concentrations have been used in combination with correction factors to estimate annual average NO_2 concentrations in future years. These factors have been adapted from both TII (2011) and DEFRA roadside NO_2 projection factors.

Adjustments to the verified modelled NO_2 concentrations are required to be made in order to account for future roadside NO_2 concentrations. An additional scenario known as the projected base year is to be included in the air quality modelling to enable a gap analysis to be completed. The gap analysis is the application of adjustment factors which take into consideration the assumed roadside rates of reduction in NO_x and NO_2 by DEFRA's modelling tools compared to observed roadside monitoring trend i.e., the gap between the predicted reductions and those observed (DMRB LA 105 guidance). This methodology has been applied to the current assessment in order to predict future NO_2 concentrations as a result of the Proposed Development and ensure that these concentrations are not under-estimated.

8.5.1.2.1.4 Determining the Impact

The TII guidance document 'Guidelines for the Treatment of Air Quality during the Planning and Construction of Road Schemes (2011)' outlines a clear methodology for determining the magnitude and significance of air quality impacts associated with road schemes; however, this remains applicable to any project which results in a change to traffic volumes. The TII significance criteria have been applied to the Proposed Development and adapted as necessary within tables 8-12 to 8-15.

Tables 8-12 to 8-15 have been designed to assist in describing the air quality impacts at each receptor. They are applicable to the pollutants which are relevant to the Proposed Development and the standards or limit values against which they are being assessed (TII, 2011). The criteria focus on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3).

The definition of 'impact magnitude' is exclusively related to the degree of change in pollutant concentrations, expressed as micrograms per cubic metre (µg/m^3). 'Impact description' takes account of the impact magnitude and of the absolute concentrations and how they are linked to the air quality standards or limit values. The descriptors for the magnitude of change due to the Proposed Development are set out in Table 8-12:

Table 8-12: Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations (Source: Adapted from TII, 2011)

Magnitude of Change	Annual Mean NO_2/PM_{10}	No. days with PM10 concentration greater than 50 µg/m^3
Large	Increase/decrease ≥4 µg/m^3	Increase/decrease >4 days

Medium	Increase/decrease 2 - <4 µg/m^3	Increase/decrease 3 or 4 days
Small	Increase/decrease 0.4 - <2 µg/m^3	Increase/decrease 1 or 2 days
Imperceptible	Increase/decrease <0.4 µg/m^3	Increase/decrease <1 day

The subsequent impact descriptors are set out in Table 8-13 and Table 8-14:

Table 8-13: Air Quality Impact Descriptors for Changes to Annual Mean NO_2 and PM_{10} Concentrations at Receptors (Source: Adapted from TII, 2011)

Absolute Concentration in Relation to Objective/Limit Value	**Change in Concentration**[7]		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value with Scheme (≥40 µg/m^3 of NO_2 or PM_{10})	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with Scheme (36-<40 µg/m^3 of NO_2 or PM_{10})	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with Scheme (30-<36 µg/m^3 of NO_2 or PM_{10})	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value with Scheme (<30 µg/m^3 of NO_2 or PM_{10})	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value with Scheme (≥40 µg/m^3 of NO_2 or PM_{10})	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value with Scheme (36-<40 µg/m^3 of NO_2 or PM_{10})	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with Scheme (30-<36 µg/m^3 of NO_2 or PM_{10})	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value with Scheme (<30 µg/m^3 of NO_2 or PM_{10})	Negligible	Negligible	Slight Beneficial

[7] Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible.

Table 8-14: Air Quality Impact Descriptors for Changes to Number of Days with PM10 Concentration Greater than 50 µg/m^3 at a Receptor (Source: TII, 2011)

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration[8]		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value with Scheme (≥35 days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with Scheme (32-<35 days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with Scheme (26-<32 days)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value with Scheme (<26 days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value with Scheme (≥35 days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value with Scheme (32-<35 days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with Scheme (26-<32 days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value with Scheme (<26 days)	Negligible	Negligible	Slight Beneficial

In terms of 'significance of effects', professional judgment has been applied in making this determination. The TII Guidance (2011) outlines that the overall air quality impact of the Proposed Development should be described as either 'insignificant', 'minor', 'moderate', or 'major'; and a number of factors, as listed in Table 8-15, are set out which should be taken into account:

Table 8-15: Factors to Consider when Determining Air Quality Significance (Source: Adapted from TII, 2011)

Factors
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.
The number of people exposed to levels above the objective or limit value, where new exposure is being introduced.

[8] Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible.

The magnitude of the changes and the descriptions of the impacts at the receptors i.e., using the findings based on Boxes Tables 8-12 to 8-14.
Whether or not an exceedance of a standard or limit value is predicted to arise in the study area where none existed before or an exceedance area is substantially increased.
Whether or not the study area exceeds a standard or limit value and this exceedance is removed, or the exceedance area is reduced.
Uncertainty, including the extent to which worst-case assumptions have been made
The extent to which a standard or limit value is exceeded, e.g., an annual mean NO_2 of 41 µg/m^3 should attract less significance than an annual mean of 51 µg/m^3

8.5.1.2.1.5 Modelling Results

The impact of the Proposed Development has been determined by modelling traffic-related air emissions resulting from the presence or absence of Proposed Development.

Concentrations of NO_2 and PM_{10} were modelled for the baseline year of 2022. As is evident from Table 8-16, the model has indicated that concentrations for all pollutants are in compliance with the annual limit of 40 µg/m^3. Therefore, in line with DMRB LA 105 guidance, further modelling of PM_{10} for the Opening and Design Years is not required. The highest road increment of PM_{10} experienced at receptors was 2.65 µg/m^3. When this is assessed in combination with the 2022 background concentration of 16.46 µg/m^3, an overall impact of 42.78% of the annual limit is experienced at the worst-case receptor.

The impact of NO_2 was predicted for the Opening and Design Years at the nearest receptors to the affected road network (ARN). The degree of impact has been determined based on both the absolute and relative impact of the Proposed Development. A ‘Do-Nothing Scenario’, which assumes that the Proposed Development does not exist in future years, has also been assessed within the model and results have been compared to determine the degree of impact.

Table 8-16: Modelled Baseline NO_2 and PM_{10} Concentrations (2022)

Receptor	ITM Coordinate	Receptor Type	Parameter	Total (µg/m³)	Road Traffic Component
R1	605777, 742626	Residential	PM_{10}	16.98	0.52
			NO_2	14.17	2.73
R2	606193, 742627	Residential	PM_{10}	16.92	0.46
			NO_2	13.82	2.38
R3	606388, 742825	Residential	PM_{10}	17.00	0.54
			NO_2	14.22	2.78
R4	606477, 742813	School	PM_{10}	17.82	1.36
			NO_2	18.2	6.76
R5	606611, 742645	Residential	PM_{10}	16.53	0.07
			NO_2	11.77	0.33
R6	606506, 742879	Residential	PM_{10}	17.06	2.6
			NO_2	14.44	3
R7	606637, 743069	Residential	PM_{10}	17.11	2.65
			NO_2	14.81	3.37
R8	607157, 743249	Residential	PM_{10}	16.98	0.52
			NO_2	14.16	2.72
R9	606282, 742949	Residential	PM_{10}	16.52	0.06
			NO_2	11.75	0.31

The impact of the Proposed Development on annual mean NO_2 concentrations in the Opening Year (2027) and Design Year (2042) has been assessed relative to the 'Do Nothing' levels. The results shown in Table 8-17 and 8-18 determine that there may be some 'imperceptible', and 'small' increases in concentrations of NO_2 at worst-case receptors assessed when compared with 'Do Nothing' levels; with the highest predicted increase of 0.22 µg/m^3 in the Opening Year measured at R4 and 1.71 µg/m^3 measured at R9 in the Design Year 'Do Something' scenarios, respectively.

In accordance with Table 8-13, when assessing the Proposed Development contribution in relation to the NO_2 objective/limit value, concentrations of NO_2 at all sensitive receptors are less than 21 µg/m^3 with the inclusion of the Proposed Development in both the Opening and Design Years, and as such, are well below the objective/limit value of 40 µg/m^3. Therefore, it is considered that the impact of the Proposed Development is minor at sensitive receptors and insignificant in terms of overall ambient air quality standards.

Having regard to the assessment criteria set out in Section 8.5.1.2.1.4 and the modelling results outlined in Table 8-17 and Table 8-18, the impact of the Proposed Development on NO_2 concentrations in the locality is likely to be 'long-term', 'negative' and 'imperceptible'.

Table 8-17: Predicted Annual Mean Concentrations of NO_2 (Opening Year 2027)

Recep-tor	Parame-ter	Back-ground (µg/m³)	Opening Year 2027				
			Do Noth-ing	Do Some-thing	Proposed Develop-ment Con-tribution	Magnitude	Impact descrip-tion
R1	NO_2	10.9	14.3	14.33	0.03	Imperceptible	Negligible Increase
R2	NO_2		13.93	13.97	0.04	Imperceptible	Negligible Increase
R3	NO_2		14.36	14.4	0.04	Imperceptible	Negligible Increase
R4	NO_2		18.68	18.9	0.22	Imperceptible	Negligible Increase
R5	NO_2		12.03	12.1	0.07	Imperceptible	Negligible Increase
R6	NO_2		14.74	14.85	0.11	Imperceptible	Negligible Increase
R7	NO_2		14.99	15.04	0.05	Imperceptible	Negligible Increase
R8	NO_2		14.29	14.33	0.04	Imperceptible	Negligible Increase
R9	NO_2		14.19	14.34	0.15	Imperceptible	Negligible Increase

Table 8-18: Predicted Annual Mean Concentrations of NO_2 (Design Year 2042)

Recep-tor	Parame-ter	Back-ground (µg/m³)	Design Year 2042				
			Do Noth-ing	Do Some-thing	Proposed Develop-ment Con-tribution	Magnitude	Impact descrip-tion
R1	NO_2	10.4	14.62	14.85	0.23	Imperceptible	Negligible Increase
R2	NO_2		14.2	14.4	0.2	Imperceptible	Negligible Increase
R3	NO_2		14.68	15.04	0.36	Imperceptible	Negligible Increase
R4	NO_2		19.12	20.36	1.24	Small	Negligible Increase
R5	NO_2		11.96	12.24	0.28	Imperceptible	Negligible Increase
R6	NO_2		14.83	15.37	0.54	Small	Negligible Increase
R7	NO_2		15.24	15.33	0.09	Imperceptible	Negligible Increase
R8	NO_2		14.61	14.69	0.08	Imperceptible	Negligible Increase
R9	NO_2		11.8	13.51	1.71	Small	Negligible Increase

8.5.2 Potential Impacts on Climate

8.5.2.1 Construction Phase

There is the potential for combustion emissions from onsite machinery and traffic derived pollutants of CO_2 and N_2O to be emitted during the construction phase of the development. However, due to the size and duration of the construction phase, and the mitigation measures proposed, the effect on national GHG emissions will be insignificant in terms of Ireland's obligations under the Kyoto Protocol and therefore will have no considerable impact on climate. Overall, climatic impacts are considered to be short-term and imperceptible.

8.5.2.2 Operational Phase

8.5.2.2.1 Flood Risk

There is growing scientific consensus that the warming of the climate is expected to increase the risk of floods. Rising sea levels and more frequent and sever coastal storms will increase the risk of coastal and estuarial flooding as well as coastal erosion. According to the Planning System and Flood Risk Management (DECLG & OPW, 2009), where the floodplain or coastal plain is well defined, climate change is expected to change the probability of flooding and the depth for a particular event with little change in spatial extent. Only where extensive areas of

land rise gently from the river or the sea is climate change expected to significantly increase the area affected by flooding.

There is a great deal of uncertainty in relation to the potential effects of climate change; therefore, a precautionary approach should be adopted, where necessary, to reflect uncertainties in flooding datasets and the ability to predict the future climate. Development should be designed with careful consideration to possible future changes in flood risk, including the effects of climate change so that future occupants are not subject to unacceptable risk (OPW, 2009).

A Flood Risk Assessment (FRA) was undertaken by EOB Management Services on behalf of the Client for the Proposed Development. This assessment concluded that the Proposed Development is considered to be adequately protected in consideration of future scenario of flood event in the area. The site of the Proposed Development is within Zone C and is appropriate for the Proposed Development from a flood risk perspective.

8.5.2.2.1.1 Energy and Sustainability Report

Building energy has been long understood as contributing a major component of GHG emissions which was acknowledged within the 2030 Communication published by the European Commission (2014) which stated that “the majority of the energy-saving potential (for the EU) is in the building sector. The EU Energy Performance of Buildings Directive set out the target that all new developments should be Nearly Zero-Energy Buildings (NZEB) by the end of 2020.

An Energy and Sustainability Report has been prepared for the Proposed Development by Balrath Engineering Consultants (2023). This report outlines the energy efficiency measures associated with the design, construction, ongoing management and maintenance of the Proposed Development. The Proposed Development will comply with the Building Regulations Part L 2019, Buildings Other Than Dwellings. As part of the development’s efforts to reduce energy consumption, the Proposed Development is targeting an A3 BER (Building Energy Rating) throughout. Extensive work has been carried out to develop a balanced design approach to achieve these onerous targets with a number of sustainable features being incorporated into the design from the early stages.

In developing the energy strategy for the Proposed Development, the incorporation of energy efficient strategies into the project deliverables will encourage the commitment to sustainable design at a very early stage and ensure that the Proposed Development will meet the principles of the Government’s ‘National Climate Change Policy’ and the NZEB criteria as set out in the Part L Regulations 2021 and will maximise the reduction in Carbon Dioxide (CO_2) emissions thus demonstrating the commitment to Climate Change.

8.5.2.2.2 GHG Emissions

8.5.2.2.2.1 Traffic

Increased LDV and HGV traffic flow because of the Proposed Development is likely to contribute to increases in GHG emissions such as CO_2 and N_2O (Nitrous Oxide). However, these contributions are likely to be marginal in terms of overall national GHG emission

estimates and Ireland's obligations under the Kyoto Protocol and the Paris Agreement, and therefore unlikely to have an adverse effect on climate. Furthermore, it is widely anticipated that CO_2 emissions for the passenger car fleet will reduce substantially in future years due to the increasing prevalence of electric or hybrid vehicle use.

8.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

Cumulative air quality impacts have the potential to arise locally when construction activities associated with the Proposed Development take place at the same time as other developments in a specific location.

All planning applications which have been granted permission and are already developed have been incorporated into the baseline assessment of this application. Table 8-19 details the existing, proposed and granted planning permissions on record in the area.

Table 8-19: Recent applications in the vicinity of the Proposed Development

Planning Ref No.	Applicant Name	Summary of Development
22253 26/10/2022	Marina Quarter Ltd	The development will consist of the following: • Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces; • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the south east of the site. • All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. ESB substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; • This development will form part of a larger/future phase of the development; • No changes to the existing pumping station located outside the northern site boundary; A Natura Impact Statement has been prepared in respect of this application.
22340	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area(c. 595

Planning Ref No.	Applicant Name	Summary of Development
Decision Due Date: 04/02/2023		sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment work and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a sections of the distributor road permitted under WMCC Reg. Refs 14/7103 ABP Ref. PL25.244826 and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated ESB substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

The cumulative effects on the air quality and climate of the current Proposed Development and other permitted or existing developments have been considered, in particular through the generation of air pollutants and GHG emissions. The potential impacts on air quality and climate are assessed in Section 8.1.5 and it is considered that there are no other potential significant cumulative impacts associated with the Proposed Development and considered offsite permitted developments.

In terms of dust, no significant impacts are predicted; good construction practice, which incorporates the implementation of the identified mitigation measures, will be employed at the Proposed Development site. Due to the implementation of good construction practices at the Site of the Proposed Development and these offsite permitted developments, it is not anticipated that significant cumulative impacts will occur.

Assessment of operational stage impacts on air quality involved traffic data which is inclusive of traffic associated with other existing and permitted developments on the road networks surrounding the site both in current and future years. Therefore, cumulative impacts have been assessed in this regard and the impact on ambient air quality has been determined as insignificant.

8.5.4 'Do Nothing" Impact

The Do-Nothing impact has been considered in terms of air quality in this chapter. If the Proposed Development did not proceed, the Proposed Development site would remain as a greenfield site. The existing ambient air quality would remain unchanged onsite and at nearby sensitive receptors.

Greenhouse gas emissions as a result of the Proposed Development are also likely to be marginal in terms of overall national GHG emission estimates and Ireland's obligations under the Kyoto Protocol when compared to a Do-Nothing scenario.

8.6 Avoidance, Remedial & Mitigation Measures

8.6.1 Air Quality

8.6.1.1 Construction Phase

It is not expected that adverse air quality impacts are likely to occur at sensitive receptors because of the Proposed Development. However, appropriate mitigation measures will be employed as necessary to further prevent such impacts occurring, as outlined in the Construction Environmental Management Plan (CEMP) which has been prepared for the Proposed Development by EOBMS Consulting Engineering Ltd (2023):

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on unsurfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness;
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the site will pass through a wheel cleansing area prior to entering the local road network.

8.6.1.2 Operational Phase

It has been determined that the Operational Phase air quality impact is negligible and therefore no site-specific mitigation measures are proposed.

8.6.2 Climate

As negative climatic impacts associated with the Construction and Operational Phases of the Proposed Development are negligible, no mitigation measures are proposed. Best practice measures will be implemented to minimise exhaust emissions from construction and operational vehicles and machinery by avoidance of engines running unnecessarily, as idle engines will not be permitted for excessive periods. Furthermore, all proposals for development will seek to achieve the greatest standards of sustainable construction and design and will have regard to sustainable building design criteria.

8.6.3 "Worst Case" Scenario

Worst case scenario would involve failures of mitigation measures for the Proposed Development. In such events, it is not considered that dust nuisances will occur due to the lack of sensitive receptors in the surrounding environment.

A worst-case scenario has been applied to the Construction Phase air quality assessment in terms of the scale of the source and potential dust nuisances. It is expected that adequate mitigation measures, as outlined in Section 8.6.1.1, will assist in preventing nuisance dust from resulting in any significant effects. In the event of a failure of such measures, it is not considered that significant dust related effects will occur.

A worst-case scenario has been applied to the Operational Phase air quality assessment in terms of traffic volumes experienced on the surrounding road network and associated air emissions. As the DMRB modelling tool does not account for electric or hybrid vehicle use, vehicle emissions applied in this study are likely to overestimate the actual vehicle emissions experienced from the Proposed Development. The worst-case contributions predicted by the tool are added to the existing background concentration to provide a worst-case predicted ambient concentration. The compliance of the Proposed Development with the relevant ambient air quality standards is subsequently assessed by comparison with the worst-case ambient concentrations. Associated impacts have been determined as insignificant in this case.

8.7 Residual Impacts

Residual Impacts are defined *as 'effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

The Proposed Development is likely to result in a long-term increase in traffic on the roads surrounding the Proposed Development Site; however, this increase in traffic has been determined to have an overall insignificant impact in terms of local air quality. Furthermore,

the increase in traffic has been determined as marginal with regard to climatic impacts. Therefore, no adverse residual impacts are anticipated from the proposed scheme in the context of air quality and climate.

8.8 Monitoring

The monitoring of construction dust during the Construction Phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the site boundary. Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at a strategic locations along the site boundaries for a period of 30 +/- 2 days. The selection of sampling point locations should be carried out in consideration of the requirements of *VDI 2119* with respect to the location of the samplers relative to buildings and other obstructions, height above ground, and sample collection and analysis procedures. After the exposure period is complete, the Gauges should be removed from the site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m^2/day in accordance with the relevant standard.

The impact on air quality and climate from the Operational Phase of the Proposed Development will be assessed to determine if specific monitoring is recommended.

8.9 Interactions

Interactions between Air Quality and Climate and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

8.9.1 Population and Human Health

Interactions between Air Quality and Population and Human Health have been considered as the Proposed Development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the Proposed Development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as negligible, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

8.9.2 Biodiversity

Interactions between Air Quality and Biodiversity have been considered as the Construction Phase has the potential to interact with flora and fauna in adjacent habitats and designated sites due to dust emissions arising from the construction works. The biodiversity assessment has inherently considered air quality effects on biodiversity receptors. There are no additional effects caused by interactions.

8.9.3 Traffic

In the current assessment, traffic derived pollutants which may affect Air Quality and Climate have been deemed as negligible. Therefore, the impact of the interaction between air quality and climate is considered to be insignificant.

8.10 Difficulties Encountered When Compiling

No difficulties have been encountered while compiling this chapter.

8.11 References

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9 NOISE AND VIBRATION

9.1 Introduction

This Chapter of the EIAR provides a description and assessment of the likely impact of the Proposed Development from noise.

This Chapter discusses the existing ambient noise levels at nearby sensitive receptors, the potential impacts of the Proposed Development on the existing ambient noise environment and the mitigation measures that may be employed to reduce or eliminate any potential impact.

9.1.1 Quality Assurance and Competence

This Chapter was prepared by Laura Griffin, Environmental Consultant, Enviroguide Consulting. Laura has a Master of Science (Hons) in Climate Change from Maynooth University and a Bachelor of Arts (Hons) in English and Geography from Maynooth University. Laura has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Air Quality and Climate, Noise and Vibration, and Material Assets Chapters of EIARs.

9.2 Study Methodology

This assessment will examine the likely impacts of sound pressure levels generated by the Proposed Development. Noise calculations will be used to predict and assess the likely impact of facility operations on noise sensitive receptors.

For the purpose of the assessment ‘sensitive receptors’ terminology used describes any persons, locations or otherwise that may be susceptible to changes as a consequence of the Proposed Development. The primary noise impacts associated with this Proposed Development are likely to be due to:

- Site clearance works;
- Building construction works;
- Trucks entering and existing the site; and
- Traffic along local road network.

With respect to the listed noise impacts, the key objective of the Proposed Development is to manage activities to ensure any significant increase in noise emissions are minimised.

Documents consulted during the preparation of this EIAR chapter are listed in the References section. The acoustics section has been compiled taking cognisance of:

- *Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011);*
- *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;*
- *ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures;*

- *ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels;*
- *ISO 9613-1:1993 Acoustics - Attenuation of sound during propagation outdoors -- Part 1: Calculation of the absorption of sound by the atmosphere;*
- *ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors -- Part 2: General method of calculation;*
- *Environmental Protection Agency (2016) Guidance Note for Noise (NG4): Licence Applications, Surveys and Assessments in Relation to Scheduled Activities;*
- *Guidelines for the Treatment of Noise & Vibration in National Road Schemes, National Roads Authority, Revision 1, 25th October 2004.*

The following noise indices, analysis and observations were reviewed.

- LAeq - The A-weighted, equivalent continuous sound level of the measurement period. Represents an 'energy average' of the sound pressure levels measured.
- LA90 – The A-weighted, noise level exceeded for 90% of the measurement period. Calculated by statistical analysis of the measurement data.
- LA10 - The A-weighted, noise level exceeded for 10% of the measurement period. Calculated by statistical analysis of the measurement data.

9.2.1 Desk Study

The noise assessment will review all existing information relating to the site and its environs, which involves a desk-based study of the following:

- An Inward Noise Impact Assessment has been undertaken on behalf of the Applicant by AWN Consulting. Data collected from this Inward Noise Impact Assessment will provide a baseline assessment for the site and will be used to assess any future noise-related impacts of activities associated with the Proposed Development.
- An evaluation of the site and the surrounding area to assess certain changes that are likely to impact the surrounding environs was carried out. Noise sensitive locations were identified and are discussed in this chapter.
- Identification of sensitive receptors for assessment (see Section 9.5.1).
- BS 5228 2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites with respect to the controlling noise and vibration impacts. In this instance, appropriate criteria relating to permissible construction noise levels are taken from Part one of the standard Noise.

9.3 The Existing and Receiving Environment (Baseline Environment)

The site is bound to the south and west by agricultural fields, to the north by an unnamed local road and to the east by Blyry Court. The dominant noise sources at the site come from local road traffic noise, bird song and foliage noise.

9.3.1 Baseline Noise Survey

Environmental noise surveys have been conducted in order to quantify noise emissions across the existing site. The external survey was conducted in general accordance with ISO1996-

2:2017 *Acoustics - Description, Measurement and Assessment of Environmental Noise -- Determination of Environmental Noise Levels*. Specific details are set out in the following sections. A full copy of the Inward Noise Impact Assessment can be found in Appendix H (AWN Consulting, 2022).

9.3.2 Survey Methodology

An unattended continuous environmental noise survey was conducted at the site from 16 August to 19 August 2022 by AWN Consulting in order to quantify the existing noise environment. Additional attended 'spot' measurements were undertaken on installation of the unattended noise monitor. The approximate noise measurement locations were selected at the proposed site as shown in Figure 9-1.

Figure 9-1: Noise Monitoring Locations

The monitoring locations were as follows:

- AML 1: Attended measurement, inside eastern site boundary
- AML 2: Attended measurement, inside north-eastern site boundary
- AML 3: Attended measurement, inside northern site boundary
- AML 4: Attended measurement, inside north-western site boundary
- UML 1: Unattended noise monitor at 4m height, located inside south-eastern site boundary

9.3.3 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 maximum sound pressure level recorded during the sample period.
- 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.

9.3.4 Instrumentation

A Brüel & Kjær 2250 sound level meter (SLM) was used for the attended noise survey. Attended surveys were conducted between the hours of 11:34hrs and 15:38hrs on 16 August 2022. A Rion NL-52 SLM was used for the unattended noise survey. The instrument was set to log overall broadband noise parameters and 1/3 octave spectrum data over 15-minute intervals, these measurements were conducted between 11:15hrs on the 16 August 2022 to 11:45hrs on the 19 August 2022.

Before and after each survey the SLMs and measurement system was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

9.3.5 Survey Results

9.3.5.1 Location AML 1

Table 9-1 summarises the attended noise measurements at AML 1.

Table 9-1: Summary of Attended Noise Levels at AML 1

Date	Time	Measured Noise Levels, dB		
		L_{Aeq}	L_{Amax}	L_{A90}
16 August 2022	11:34 – 11:49	49	68	44
	13:18 – 13:33	51	61	46
	14:42 – 14:53	51	64	47

The noise environment at this location was dictated by road traffic noise from N55. There was some additional noise from truck activity from nearby car dealership during the first measurement. Other noise sources included bird song and foliage noise. Ambient noise levels were in the range of 42 – 49 dB $L_{Aeq,15min}$. Background noise levels were in the range 36 – 44 dB $L_{A90,15min}$.

9.3.5.2 Location at AML 2

Table 9-2 summarises the attended noise measurements at AML 2.

Table 9-2: Summary of Attended Noise Levels at AML 2

Date	Time	Measured Noise Levels, dB		
		L_{Aeq}	L_{Amax}	L_{A90}
16 August 2022	12:15 – 12:30	49	78	42
	13:36 – 13:49	46	64	43
	15:03 – 15:18	44	58	41

The noise environment at this location comprised of distant road traffic noise, bird song and foliage noise. Livestock noise from a cow shed nearby also effected the measurements.

Ambient noise levels were in the range of 44 – 49 dB $L_{Aeq,15min}$. Background noise levels were in the range 41 – 43 dB $L_{A90,15min}$.

9.3.5.3 Location AML 3

Table 9-3 summarises the attended noise measurements at AML 3.

Table 9-3: Summary of Attended Noise Levels at AML 3

Date	Time	Measured Noise Levels, dB		
		L_{Aeq}	L_{Amax}	L_{A90}
16 August 2022	12:35 – 12:50	43	69	35
	13:57 – 14:12	40	54	37
	15:23 – 15:38	43	68	37

The noise environment at this location comprised mainly of distant road traffic noise from N55, a small amount of local road traffic noise, bird song and foliage noise. Livestock from a cow although distance was still also audible. Ambient noise levels were in the range of 40 – 43 dB $L_{Aeq,15min}$. Background noise levels were in the range 35 – 37 dB $L_{A90,15min}$.

9.3.5.4 Location AML 4

Table 9-4 summarises the attended noise measurements at AML 4.

Table 9-4: Summary of Attended Noise Levels at AML4

Date	Time	Measured Noise Levels, dB		
		L_{Aeq}	L_{Amax}	L_{A90}
16 August 2022	12:54 – 13:09	42	62	36
	14:18 – 14:33	43	59	36
	15:42 – 15:53	41	67	36

The noise environment at this location comprised mainly of foliage noise and birdsong, with a small amount of local road traffic. Ambient noise levels were in the range of 41 – 43 dB LAeq,15min. Background noise levels were in the order 36 dB LA90,15min.

9.3.5.5 Location UML 1

Table 9- presents a summary of noise levels measured during the unattended noise survey at UML1 over the 16-hour daytime period (07:00 to 23:00hrs) and the 8-hour night-time period (23:00 to 07:00hrs) between 16 August and 19 August 2022.

Table 9-5: Summary of Unattended Measured Noise Levels at Location UML 1

Date	Time	Measured Noise Levels, dB		
		L_{Aeq}	L_{Amax}	L_{A90}
16 August 2022	12:54 – 13:09	42	62	36
	14:18 – 14:33	43	59	36
	15:42 – 15:53	41	67	36
16 Aug	Day	62	70 – 80	55
	Night	58	70 – 76	44
17 Aug	Day	64	70 - 88	51
	Night	58	70 – 77	47
18 Aug	Day	65	72 – 77	54
	Night	57	69 – 76	50

19 Aug	Day	66	74 – 87	53
	Night	58	69 – 76	41
Average	Day	65	72 – 83	53
	Night	58	70 – 76	46

The prevailing noise environment at this location is dominated by traffic noise on the N55. There was also noise from breeze in trees and foliage noise. L_{AFmax} values were measured at 15-minute intervals over the duration of the unattended monitoring survey. Figure 5 presents the number of measured L_{AFmax} events for various decibel levels during the night period.

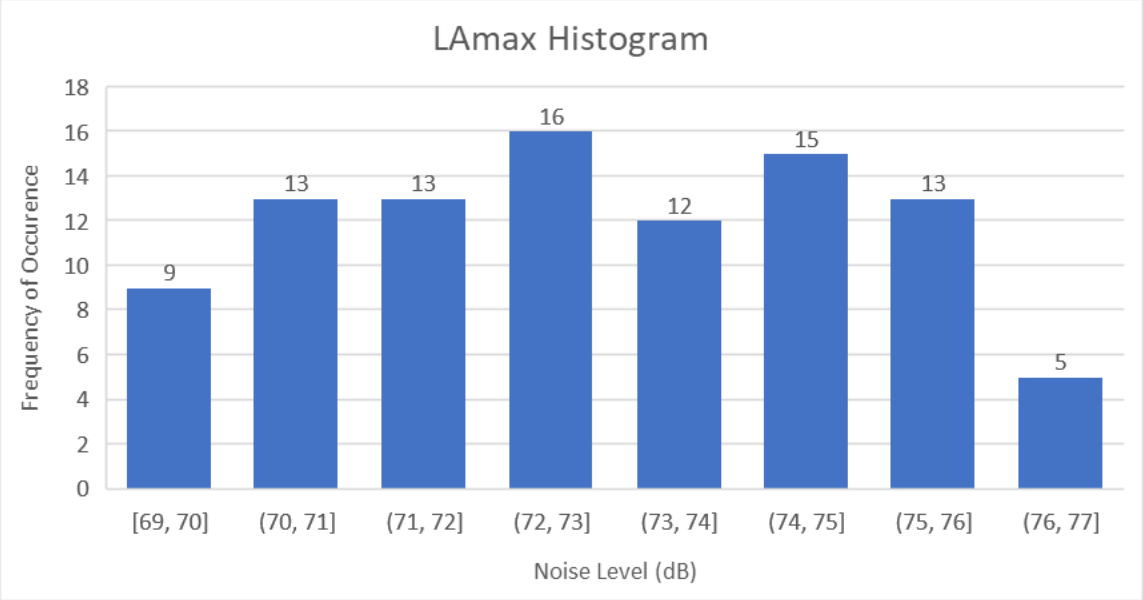


Figure 9-2: Distribution of the Magnitude of L_{AFmax} Events (AWN Consulting, 2022)

The L_{AFmax} values range from <69 to 77 dB during the night period. For the purposes of assessment, the value 75 dB L_{Amax} is used. This value is not exceeded on average more than 3 times per night. Review of the graph above indicates this level is not regularly exceeded on a given night.

In addition to the baseline noise surveys measured on site, reference has been made to the most recent Round 3 noise maps published by the EPA (http://gis.epa.ie) for road traffic levels. The published noise maps are provided for the overall day-evening-night period in terms of L_{den} and for the night-time period in terms of L_{night}. For this assessment, reference is made to the L_{night} mapping information to compare against the relevant parameters of the ProPG assessment.

Figure 9-3 presents the mapped noise levels across the development site for road traffic during the night-time periods using the L_{night} parameter. The outline of the site is marked in red.

Figure 9-3: L_{night} Noise Contours for Road Traffic across the site (Annotated by AWN Consulting Ltd)

The noise mapping indicates a road traffic noise level between 55 to 59 dB L_{night} along the most southern eastern boundary facing the N55, which aligns with noise levels recorded at Location UML1 which sits within this contour. Within the mid-southern to eastern portion of the site traffic noise levels are mapped within the 50 to 54 dB L_{night} contour. Further into the site road traffic noise levels are reducing to below 45 dB L_{night}.

9.3.6 Noise Risk Assessment Conclusion

With reference to the Noise Risk assessment outlined in ProPG, the noise levels for the relevant periods have been derived in order to classify the Proposed Development Site. Table 9-6 summarises the predicted noise levels at the most exposed proposed building facades, as per the proposed site layout.

Table 9-6: Categorising Proposed Site

Period	Measured/Predicted Noise Level (dB, $L_{Aeq,T}$)	"Risk Category"
Daytime	65	Low – Medium
Night-time	58	Low – Medium

The noise risk assessment concluded that the level of risk on the Proposed Development Site can be classified as a low to medium noise risk.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. The results indicate that L_{AFmax} noise levels are unlikely to exceed 80dB more than 20 times

per night, and therefore does not exceed the threshold whereby ProPG recommends that the site is not considered as high risk with respect to this aspect.

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 *Low* to *Medium* 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 or high-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 suitably 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.

9.3.7 Stage 2 – Full Acoustic Assessment

Stage 2 of the recommended approach contains four key elements to be undertaken in parallel and each has been considered in the Inward Noise Impact Assessment (AWN Consulting, 2022), a full copy of which can be found in Appendix H of this EIAR.

The four key elements are as follows:

- Stage 2: Element 1 – Good Acoustic Design Process

- Stage 2: Element 2 – Internal Noise Level Guidelines
- Stage 2: Element 3 – External Amenity Area Noise Assessment
- Stage 2: Element 4 – Assessment of Other Relevant Issues

9.3.8 Conclusion

The baseline noise survey was undertaken at the Site to determine the existing noise environment at the site. An inward noise assessment has been undertaken based on the results of the noise survey as recommended in the ProPG: Planning & Noise guidance document.

The measured noise levels on the site were used to calculate noise levels at specific facades of proposed residential properties and to predict the internal noise levels within living room and bedroom spaces, taking account of the proposed building envelope and conditions in the receiving rooms (e.g., volumes and room acoustic characteristics). Based on these noise levels, appropriate acoustic glazing and ventilators have been recommended to facades effected by noise levels from the N55.

Based on the implementation of the measures outlined in this assessment, the predicted noise levels conform to the criteria taken from BS8233:2014 for acceptable internal noise levels. It should be noted that the predicted internal noise levels, detailed in the Inward Noise Impact Assessment, assume that windows and doors will be closed, and vents will be open. As discussed in Section 4.1.2 of the Inward Noise Impact Assessment, there is no requirement for assessment of internal noise levels with windows open, however it is expected that a good portion of site will achieve at least 'reasonable' internal noise levels with windows open.

It is predicted that the majority of the amenity space will experience noise levels of ≤55 dB $L_{Aeq,16hr}$ in line with the recommended noise level.

9.3.9 Quiet Area Screening

Screening was carried out to identify the potential of the Proposed Development located in or near an area that could be considered a 'Quiet Area' in open country in accordance with the Environmental Protection Agency's publication "Environmental Quality Objectives – Noise in Quiet Areas, 2003.

The criteria used to assess this determination comprised of the following

- At least 3 km from urban areas with a population >1,000 people;
- At least 10 km from any urban areas with a population >5,000 people;
- At least 15 km from any urban areas with a population >10,000 people;
- At least 3 km from any local industry;
- At least 10 km from any major industry centre;
- At least 5 km from any National Primary Route, and;
- At least 7.5 km from any Motorway or Dual Carriageway.

If the Site does not meet the listed criteria, it is considered to be a non-quiet area as per the definition of the Environmental Protection Agency. 'Quiet Areas', according to NG4 (2016). Before relevant noise criterion can be applied, 'Quiet Area Screening' must be performed to

identify or rule out the Site as a Quiet Area. Quiet Area screening results can be viewed in Table 9-7.

Table 9-7: Quiet Area Screening of the Development Location

Quiet Area Screening of the Development Location			
Screening Question	**Answer (Yes/No)**		**Screening Results**
Is the site >3km away from urban areas with a population >1,000 people?	Yes □	No ✓	The Proposed Development is located less than 3km from Athlone which has a population of 21, 349.
Is the site >10km away from urban areas with a population >5,000 people?	Yes □	No □	The Proposed Development is located less than 10km from Athlone which has a population of 21, 349.
Is the site >15km away from urban areas with a population >10,000 people?	Yes □	No □	The Proposed Development is located less than 15km from Athlone which has a population of 21, 349.
Is the site >3km away from any local industry?	Yes □	No ✓	The Proposed Development is located approx. 700m from Blyry Industrial Estate.
Is the site >10km away from any major industry centre?	Yes □	No ✓	The Proposed Development is located approx. 700m from Blyry Industrial Estate.
Is the site >5km away from any national primary route?	Yes □	No ✓	The N55 is located 150m from the Proposed Development.
Is the site >7.5km away from any motorway or dual carriageway?	Yes □	No ✓	The N6 is located approx. 1.3km from the Proposed Development.
QUIET AREA?	**No**		**The site does not meet these criteria it is not considered to be a quiet area.**

According to the EPA Guidance, *NG4*, where an area is determined not to be a 'quiet area', baseline monitoring should be conducted to determine if there is a low background noise. As the Proposed Development is located in an area which does not meet the criteria as per EPA screening guidelines, a low background noise would not be predicted. As such, baseline noise monitoring for the site is recommended.

9.3.10 Recommended Noise Limits

Currently, there is no statutory guidance in Ireland which indicates the maximum permissible noise level that may be generated during the Construction Phase of a development. Noise limits for construction activities are often applied at the discretion of the local authority along with limits on the hours of operation.

In the current assessment, British Standard *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites* has been consulted in order to derive appropriate criteria relating to relating to permissible noise levels during the Construction Phase of a development of this scale.

A conventional EIA methodology in determining the significance of construction noise levels is to consider the change in the ambient noise level with the construction noise. *BS 5228-1*

outlines two approaches to this methodology. The approach which has been adopted in the current assessment is known as the ABC method. This approach calls for the designation of noise sensitive locations into a specific category (A, B, or C) based on existing ambient noise levels in the absence of construction noise. A threshold value is then set which, if exceeded at this location, indicates a possible significant noise impact due to construction activities.

The following table sets out values, as outlined within *BS 5228-1* that signify a potential significant impact if exceeded at residential receptors. These values relate to construction noise levels only.

Table 9-8: Example threshold of significant effect at dwellings (Source: BS 5228-1)

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (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.

Notwithstanding the outcome of the above assessment, *Transport Infrastructure Ireland (TII) publication Guidelines for the Treatment of Noise and Vibration in National Road Schemes* have set out the overall acceptable levels of construction noise which should not be exceeded at noise sensitive locations during the Construction Phase; these are presented in the following table:

Table 9-9: Maximum permissible noise levels at the facade of dwellings during construction

Days & Times	$L_{Aeq\ (1hr)}$ dB	$L_{pA(max)slow}$ dB
Monday to Friday (07.00 to 19.00hrs)	70	80
Monday to Friday (19.00 to 22.00hrs)	60	65
Saturday (08.00 to 16.30hrs)	65	75
Sundays and Bank Holidays (08.00 to 16.30hrs)	60	65

Based on a review of the aforementioned guidance documents and the baseline noise environment, the following daytime noise criteria are recommended for the Proposed Development site:

Table 9-10: Recommended Noise Limit Criteria

Parameter	Emission Standard	Basis of Standard
Monday to Friday (07.00 to 19.00 hours)	<70 dB(A) $L_{Aeq\ (1\ hour)}$	BS 5228-1; Transport Infrastructure Ireland (TII)
Saturday (09.00 to 13.00)	<65 dB(A) $L_{Aeq\ (1\ hour)}$	

9.3.11 Noise

Noise is defined as any sound that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it. In summary noise can be defined as any unwanted sound. Sound levels are expressed in decibels (dB) on a logarithmic scale, where 0dB is nominally the "threshold of hearing" and 120dB is nominally the "threshold of pain" (refer to Figure 9-1 below).

Background noise is defined as '*the steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$)*'. According to the EPA Noise Guidance NG4, an area of low background noise is one where the existing background noise levels measured during an environmental noise survey are as follows:

- Average Daytime Background Noise Level ≤40dB L_{AF90}, and;
- Average Evening Background Noise Level ≤35dB L_{AF90}, and;
- Average Night-time Background Noise Level ≤30dB L_{AF90}.

The Proposed Development is considered to be a non-quiet area as per EPA screening guidelines.

Figure 9-4 depicts typical sounds and their noise levels on a decibel scale.

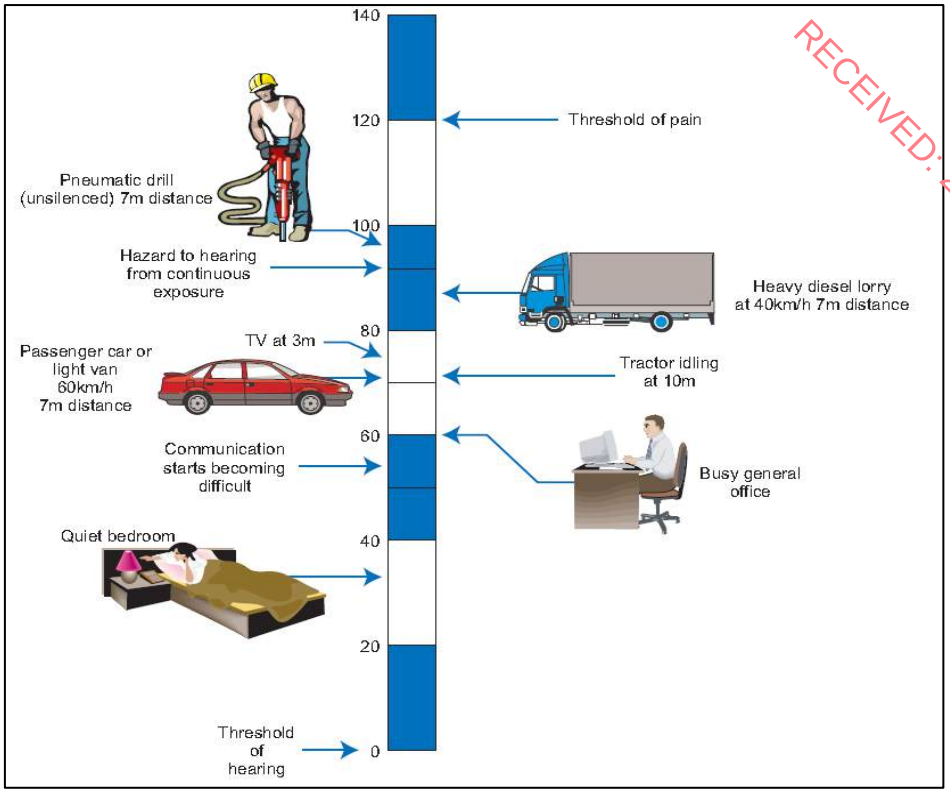


Figure 9-4: Scale and Indicative Noise Levels on the dB(A) Scale (Based on guidance taken from: Design Manual for Roads and Bridges, Volume 11 Consolidated Edition 1993)

9.4 Characteristics of the Proposed Development

9.5 The Proposed Development will be a residential development. It is not considered to be a major emitter of noise pollution during the Operational Phase. Potential Impact of the Proposed Development

This section assesses the impact of the Proposed Development on the human environment. The noise generating activities associated with the site are as follows:

- Site clearance works (Construction Phase);
- Building construction works (Construction Phase);
- Trucks entering and existing the site (Construction Phase);
- Traffic along local road network (Construction and Operational Phase).

9.5.1 Noise Sensitive Locations

The EPA define noise sensitive locations as '*any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels*'.

In identifying sensitive receptors, consideration has been given residential properties or noise sensitive premises such as schools or hospitals, or recreational spaces within a close proximity of the Proposed Development. Identified noise sensitive locations (NSLs) in relation

to the Proposed Development can be viewed in Table 9-11. The nearest noise sensitive locations are residential properties which are located approximately 20m - 60m from the site boundary. This has been assessed and discussed in further detail in Section 9.5.2.1.

Table 9-11: Sensitive Receptors

Name	Type	Coordinates		Orientation Relative to Site Boundary
		X	Y	
Clonagh	Residential	53.441618	-7.905437	20m North
Clonagh	Residential	53.441613	-7.906701	20m West
Clonagh	Residential	53.440220	-7.902083	60m North
Cornamaddy	Residential	53.437497	-7.903058	20m South
Drumaconn	Residential	53.436621	-7.905391	60m South
Cornamaddy	Residential	53.437655	-7.900178	60m East

9.5.2 Construction Phase

During the Construction Phase the main site activities will include, site clearance/excavation works, construction/road works and landscaping. This phase has the greatest potential noise and vibration impacts on its surrounding environment; however, this phase will be of short-term impact.

9.5.2.1 Noise from Onsite Plant and Equipment

Noise and vibration can arise from vehicular traffic as well as from the operation of fixed or mobile machinery onsite. Onsite activity involves Site clearance and construction. A variety of plant items will be used for the purposes of Site clearance and construction.

Noise prediction calculations have been completed for noise from the use of onsite plant up to 60m from the source. According to the inverse square law, for each doubling of distance from a point source, the sound pressure level decreases by approximately 6 dB. The reference levels were calculated and projected for a range of distances from the source to the appropriate receptor using the following formula:

$$L_{Source} \approx L_{Ref} - 20 \cdot \text{Log10}(R2/R1)$$

Where:

L_{Source} = Sound Pressure Level at Initial Location

L_{Ref} = Sound Pressure Level at the new Location

R1 = Distance from the noise source to initial location

R2 = Distance from noise source to the new location

The calculations make a number of assumptions such as:

1. There is a straight line between the source and observer.
2. Meteorological conditions are static.
3. There are no natural barriers that affect attenuation of noise other than distance.
4. All plant items are operating from a single source simultaneously and at full capacity.
5. All plant items are operating at the edge of the work area closest to the sensitive receptor.

The inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area. It is noted that the sound intensity from a point source will obey the inverse square law if there are no reflections or reverberation. If there are barriers between the source and the point of measurement, you are likely to get less than what the inverse square law predicts.

Table 9-12 sets out the equipment associated with the Proposed Development and associated dB(A) levels according to BS 5228-1, and the inverse square law:

Table 9-12: Equipment associated with proposed construction activities

Plant Item	Ref	dB(A) @10m	dB(A) @-20m	dB(A) @ 60m
Loading Shovel	BS 5228-1	76.5	70.5	60.9
Excavator	BS 5228-1	75	69	59.4
Mobile Crane	BS 5228-1	70	64	54.4
Generator	BS 5228-1	65	59	49.4
Dozer	BS 5228-1	81	75	65.4

Table 9-12 outlines the predicted noise levels at reference distances using *BS 5228-1* recommendations. The predicted noise levels from onsite activities up to 60m from the operational site have been included. The closest NSL to onsite construction activities is 20m from the site. There is the potential for the adopted criteria to be exceeded by both the loading shovel and the dozer during the construction works at the nearest sensitive receptors. However, there are hedgerows on the intervening lands between the Site Boundary and the residential dwellings. It is important to recognise that the sound intensity from a point source will obey the inverse square law if there are no reflections or reverberation. If there are barriers between the source and the point of measurement, you are likely to get less than what the inverse square law predicts. Therefore, when taking account of local terrain, predicted noise levels at the closest residential noise sensitive locations are expected to be lower than what is outlined in Table 9-12. Nevertheless, mitigation measures, as outlined in Section 9.6.1, will be implemented to reduce any potential impacts.

It is not envisaged for any excessively noisy activities to be carried out over extended periods of time during the Construction Phase.

9.5.3 Operational Phase

During the Operational Phase of the development, no significant sources of noise or vibration are expected with the development. The primary source of outward noise in the operational

context relates to any changes in traffic flows along the local road network and any operational plant noise used to serve the ancillary elements within the residential units and the crèche.

Once the development is completed, the potential noise impacts to the surrounding environment are 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 are 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 Proposed Development. Potential noise impacts also relate to operational plant serving the apartment buildings such as heat pumps.

Once operational, there are no vibration sources associated with the development site.

9.5.3.1 Noise from Operational Traffic

Volume 3 'Traffic' has been prepared by Roadplan Consulting Limited.

The Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011) states that "*changes in traffic volume on existing roads or new routes may cause either of the threshold values for noise to be exceeded. A change in noise level of 1dB LA10, 18h is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3dB LA10, 18h is equivalent to a 100% increase or a 50% decrease in traffic flow*".

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the Operational Phase and therefore no detailed assessment is required as per the DMRB Guidelines. Refer to Volume 3 of the EIAR for a detailed traffic assessment report.

The impact of noise from operational traffic will be unnoticeable and will not have a negative impact.

9.5.4 Potential Cumulative Impacts

Cumulative impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

The cumulative effects of noise and vibrations from the Proposed Development and other existing developments have been considered, in particular through the generation of nuisance noise. All planning applications which have been granted permission and are already developed have been incorporated into the baseline assessment of this application. A planning search has revealed that there have been a number of planning applications in the vicinity of the Proposed Development Site which have been granted permission, that could potentially

be constructed at the same time as the Proposed Development. Table 9-13 details the planning applications in the surrounding area.

Table 9-13: Recent applications in the vicinity of the Proposed Development

Planning Ref No.	Applicant Name	Summary of Development
22253 26/10/2022	Marina Quarter Ltd	The development will consist of the following: • Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces; • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the south east of the site. • All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. ESB substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; • This development will form part of a larger/future phase of the development; • No changes to the existing pumping station located outside the northern site boundary; A Natura Impact Statement has been prepared in respect of this application.
22340 Decision Due Date: 04/02/2023	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area(c. 595 sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section

Planning Ref No.	Applicant Name	Summary of Development
		of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Refs 14/7203 ABP Ref. PL25.244826 and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated ESB substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

In terms of the effects of noise and vibrations, no significant impacts are predicted; good construction practice, which incorporates the implementation of the identified mitigation measures, will be employed at the Proposed Development site. Due to the implementation of good construction practices at the Site of the Proposed Development and these offsite permitted developments, it is not anticipated that significant cumulative impacts will occur.

9.5.5 "Do Nothing" Impact

A do-nothing scenario would result in the site remaining as a greenfield site. The existing noise and vibration levels will remain unchanged onsite and at nearby NSLs.

9.6 Avoidance, Remedial & Mitigation Measures

9.6.1 Construction Phase

In order to control likely noise impacts caused by the Proposed Development, best available technology will be employed by the appointed Main Contractor to minimise noise from the construction operations and will comply with the mitigation measures as set out in *BS 5228-1: A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoid 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 becomes a source of 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.

A Construction Environmental Management Plan has been prepared for the Proposed Development by EOBMS Consulting Engineers Ltd and outlines the following proposed environmental noise mitigation measures:

Proposed measures to control noise include:

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts;
- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations;
- Plant with the potential of generating noise or vibration will be placed as far away from sensitive properties as permitted by site constraints;
- Regular maintenance of plant will be carried out in order to minimise noise emissions;
- Particular attention will be paid to the lubrication of bearings and the integrity of silencers;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works;
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machines, which are used intermittently, will be shut down during those periods when they are not in use;
- Training will be provided by the Site Management to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and
- Local areas of the haul route will be condition monitored and maintained if necessary.

It is recommended that drivers of heavy goods vehicles (HGVs) associated with the development extend due care and courtesy to other road users. Excessive use of and unnecessary engine racing will be avoided.

9.6.2 Operational Phase

During the operational phase of the development, noise mitigation measures with respect to the outward impact of the development are not deemed necessary.

9.6.3 “Worst Case” Scenario

The worst-case scenario would involve the failure of mitigation measures for the Proposed Development. In this scenario there is the potential for short-term, intermittent noise-related impacts.

9.7 Residual Impacts

Residual Impacts are defined as ‘*effects that are predicted to remain after all assessments and mitigation measures*’. They are the remaining ‘environmental costs’ of a project and are the final or intended effects of a development after mitigation measures have been applied to

avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

No residual impacts are anticipated.

9.8 Monitoring

Noise and vibration monitoring is not expected to be required for the Proposed Development. If, however, adverse noise impacts were to be identified at one of the noise sensitive locations, a boundary noise monitor may be installed to monitor noise and inform avoidance/mitigation efforts.

9.9 Interactions

9.9.1 Population and Human Health

The impact assessment of noise and vibration has concluded that additional noise associated with the Proposed Development of will be intermittent and will not create any major negative impacts beyond the Site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation from the Proposed Development. No human health impacts are anticipated as a result of noise from the Proposed Development.

9.9.2 Traffic

The Proposed Development will not have a significant impact on traffic volumes in the local network, and therefore traffic will not result in any significant increases of noise at sensitive receptors.

9.9.3 Biodiversity

It is not considered that the Noise and Vibration effects of the Proposed Development will not have an adverse impact on biodiversity in the local area. While the proposed Construction Phase will result in a temporary increase in noise and vibration, it is considered that this will not cause a significant disturbance to the local fauna including birds due to the proposed mitigation measures.

9.10 Difficulties Encountered When Compiling

No difficulties were encountered.

9.11 References

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.

County Westmeath Noise Action Plan 2018 – 2023

Dept. of Housing, Planning and Local Government (DHPLG), 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018.

Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011);

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

Guidelines for the Treatment of Noise & Vibration in National Road Schemes, National Roads Authority, Revision 1, 25th October 2004.

ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures.

ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels.

ISO 9613-1:1993 Acoustics - Attenuation of sound during propagation outdoors -- Part 1: Calculation of the absorption of sound by the atmosphere.

ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

10 LANDSCAPE AND VISUAL ASSESSMENT

10.1 Introduction

This Landscape and Visual Impact Assessment chapter has been prepared in respect of Proposed Development to develop a housing development in Athlone Co. Westmeath.

This chapter assesses the effects of the Proposed Development on the landscape and visual amenities of the area and details the potential direct and indirect effects of the Proposed Development on landscape fabric, character and quality, and the resulting impact on visual amenity.

The aim of a Landscape and Visual Impact Assessment is to identify the elements of the landscape which make it unique and the extent to which it is possible to alter these landscapes before unacceptable consequences arise. Landscape character represents the individuality of an area based on its particular combination of features and elements. The purpose of this assessment is to evaluate the existing landscape character of the Site and surroundings, to assess the visual impact of the Proposed Development and to identify landscape designations and planning policies that may concern the subject Site and its environs.

Landscape Impact Assessment (LIA) relates to assessing effects on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or the introduction of new elements. Visual effects may occur from *Visual Obstruction* (blocking of a view, be it full, partial or intermittent) or *Visual Intrusion* (interruption of a view without blocking).

Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by the Proposed Development in conjunction with other developments, or actions that occurred in the past, present or are likely to occur in the foreseeable future.

10.1.1 Quality Assurance and Competence

This Chapter was prepared by Enviroguide Environmental Consultants Nuno Costa and Dara Hilliard.

Nuno has a M.Sc. in Landscape Architecture from *University of Porto*, a Postgraduate Diploma in Advanced Studies in Territory, Environment and Sustainable Development from *Nova*

University Lisbon, and is a PhD student in Landscape Architecture and Urban Ecology. Nuno has 13 years professional experience as a Landscape Architect.

10.2 Methodology

This section sets out the methodology for the Landscape and Visual Assessment (LVA) as a result of the Proposed Development.

10.2.1 Guidelines and other information used in the LVA

The assessment has been undertaken in accordance with best practice, legislation and guidance notes. The methodology used is based on the Environmental Protection Agency *Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Report (2022*) and subsequent Advice Notes, and their precursor *The Guidelines on the Information to be contained in Environmental Impact Statements (2002)* and *Advice notes on current practise in the preparation of* Environmental Impact Statements (2003). It is also based on the Department of the Environment, Heritage and Local Government's Document; Architectural Heritage Protection, Guidelines for Planning Authorities, 2004 and the Landscape Institute and Institute of Environmental Management & Assessment Document *Guidelines for Landscape and Visual Impact Assessment* (2013).

The aforementioned documents recommend baseline studies to describe, classify and appraise the existing landscape and visual properties, focusing on any sensitive receptors in the area and the ability of the landscape to accommodate the Proposed Development changes that will occur at the subject Site. This is established through a collective process of desktop study and onsite survey work. Once the baseline conditions are established it allows for the identification of impacts, and an assessment of their magnitude and significance on the landscape character and visual amenities of the area.

A judgement on the sensitivity of the landscape is made from a combination of the susceptibility of the landscape to development, and therefore change, and the value attached to that landscape. This is determined by way of existing designations, both legislative and non-legislative for scenic beauty, landscape quality, recreational value, significant importance, rarity etc. Visual sensitivity is determined by a combination of judgements about the susceptibility of visual receptors such as dwellings, roads, scenic spots etc. to changes in visual amenity and the value attached to these views. The *Guidelines for Landscape and Visual Impact Assessment* state that the aim is "*to establish the area in which the development will be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at those points*".

The assessment of the landscape and visual impacts for this development was informed by the guidance documents indicated on the References Chapter. However, documents: "*Meath County Development Plan 2021-2027*" and "*The Landscape Institute, 'Guidelines for Landscape and Visual Impact Assessment', (3rd Edition) 2013*" had a special relevance in this analysis.

10.2.2 Desktop Study

The desktop study comprised the following:

- Establishing an appropriate Study Area from which to study the landscape and visual effects of the Proposed Development;
- Review of Viewsheds, which indicates areas from which the Proposed Development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity.

10.2.3 Fieldwork

Site visit (in September 2022) and desk studio were carried out in order to:

- Select a refined set of VRP's for assessment.
- Record a description of the landscape elements and characteristics within the Study Area generally and also within view from each VRP.
- Capture high quality base photography by *Park Hood Chartered Landscape Architects*, from which to prepare Verified View Montages (VVMs) of the proposal.

10.2.4 Landscape and Visual Assessment Criteria

The assessment of landscape and visual effects involves a description of the geographic location and landscape context of the Proposed Development as well as a general landscape description concerning essential landscape character and salient features of the wider Study Area. This is discussed with respect to: landform and drainage; vegetation and land use; centres of population and houses; transport routes and public amenities and facilities. Consideration of design guidance, the planning policy context and relevant landscape designations are also considered.

Once the baseline environment was established, an assessment of the likely potential significant effects associated with the Proposed Development was carried out. This included the following:

- Appraisal of salient landscape character.
- Appraisal of predicted landscape effects.
- Appraisal of predicted visual Viewsheds maps as well as Verified View Montages prepared by *Park Hood Chartered Landscape Architects* from selected VRP locations.
- Appraisal of predicted cumulative effects using cumulative VVMs.
- Discussion of mitigation measures.
- Assessment of residual effects following mitigation.

10.2.5 Assessment of Effects

The landscape and visual impact assessment seeks to identify, predict and evaluate the significance of potential effects to landscape characteristics and established views. The assessments are based on an evaluation of the sensitivity to change and the magnitude of

change for each landscape or visual receptor. The assessment acknowledges that landscape and visual effects change over time as the existing landscape evolves and proposed planting establishes and matures. The assessment therefore reports on potential effects during both the construction phase and the operational phase of the Proposed Development. The prominence of the Proposed Development in the landscape or view will vary according to the existing screening effects of local topography, structures and buildings, intervening existing vegetation and type and height of the proposed structures.

10.2.5.1 Landscape Effects

Landscape effects describe the impact on the fabric or structure of a landscape or landscape character. The assessment of landscape effects firstly requires the identification of the components of the landscape. The landscape components are also described as landscape receptors and comprise the following: Individual landscape elements or features; Specific aesthetic or perceptual aspects; and Landscape character, or the distinct, recognisable and consistent pattern of elements (natural and man-made) in the landscape that makes one landscape different from another. The assessment will identify the interaction between these components and the Proposed Development during construction and operational phases. The condition of the landscape and any evidence of current pressures causing change in the landscape will also be documented and described.

Landscape Value

Landscape value is frequently addressed by reference to international, national, regional and local designations, determined by statutory and planning agencies. However, the absence of such a designation does not necessarily imply a lack of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource. The quality and condition are also considered in the determination of the value of a landscape. The evaluation of landscape value is undertaken with reference to the definitions stated in Table 10-1.

Table 10-1: Landscape Sensitivity Criteria

Landscape Value	Classification Criteria
High	Nationally designated or iconic, unspoilt landscape with few, if any, degrading elements.
Medium	Regionally or locally designated landscape, or an undesignated landscape with locally important landmark features and some detracting elements.
Low	Undesignated landscape with few if any distinct features or with several degrading elements.

The landscape of the site of the Proposed Development is considered to have a Medium Landscape Value.

Landscape Susceptibility

Landscape susceptibility relates to the ability of a particular landscape to accommodate the Proposed Development. Landscape susceptibility is appraised through consideration of the baseline characteristics of the landscape and in particular the scale or complexity of a given landscape. The evaluation of landscape susceptibility is undertaken with reference to a three-point scale, as outlined in Table 10-2:

Table 10-2: Landscape Susceptibility Criteria

Landscape Susceptibility	Classification Criteria
High	Small scale, intimate or complex landscape considered to be intolerant of even minor change.
Medium	Medium scale, more open or less complex landscape considered tolerant to some degree of change.
Low	Large scale, simple landscape considered tolerant of a large degree of change.

The landscape of the site of the Proposed Development is considered to have a Medium Landscape Susceptibility.

Landscape Sensitivity

Landscape sensitivity to change is determined by employing professional judgment to combine and analyse the identified landscape value, quality and susceptibility and is defined with reference to the scale outlined in Table 10-3:

Table 10-3: Landscape Sensitivity Criteria

Class	Criteria
High	Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. Landscape designated for its international or national landscape value or with highly valued features. Outstanding example in the area of well cared for landscape or set of features that combine to give a particularly distinctive sense of place. Few detracting or incongruous elements
High-Medium	Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent. Good example in the area of reasonably well cared for landscape with notable landscape features.

Class	Criteria
Medium	Landscape characteristics or features with moderate capacity to absorb change without fundamentally altering their present character. Landscape designated for its local landscape value or a regional designated landscape where the characteristics and qualities that led to the designation of the area are less apparent or are partially eroded or an undesignated landscape which may be valued locally – for example an important open space. An example of a landscape or a set of features which is neutral or mixed character.
Medium – Low	Landscape characteristics or features which are reasonably tolerant of change without detriment to their present character. No landscape designation present or of medium to low local value, or an example of a common or un-stimulating landscape or set of features and conditions.
Low	Landscape characteristics or features which are tolerant of change without detriment to their present character. No designation present or of low local value. An example of monotonous unattractive visually conflicting or degraded landscape or set of features.

The landscape of the site of the Proposed Development is considered to have a Medium Landscape Sensitivity.

Magnitude of Landscape Change

Magnitude of landscape change is an expression of the size or scale of change in the landscape, the geographical extent of the area influenced and the duration and reversibility of the resultant effect. The variables involved are described below:

- The extent of existing landscape elements that will be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape;
- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones;
- Whether the effect changes the key characteristics of the landscape, which are integral to its distinctive character;
- The geographic area over which the landscape effects will be felt (within the Proposed Development site itself; the immediate setting of the Proposed Development site; at the scale of the landscape type or character area; on a larger scale influencing several landscape types or character areas); and
- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

Changes to landscape characteristics can be both direct and indirect. Direct change occurs where the Proposed Development will result in a physical change to the landscape within or adjacent to the Proposed Development site. Indirect changes are a consequence of the direct

changes resulting from the Proposed Development. They can often occur away from the Proposed Development site (for example, off-site construction staff parking) and may be a result of a sequence of interrelationships or a complex pathway (for example, a new road or footpath construction may increase public access and associated problems e.g., littering). They may be separated by distance or in time from the source of the effects.

The magnitude of change affecting the baseline landscape resource is based on an interpretation of a combination of the criteria set out in Table 10-4.

Table 10-4: Magnitude of Landscape Change Criteria

Magnitude Landscape Change	Classification Criteria
None	Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. Landscape designated for its international or national landscape value or with highly valued features. Outstanding example in the area of well cared for landscape or set of features that combine to give a particularly distinctive sense of place. Few detracting or incongruous elements
Negligible	Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent or a landscape with highly valued features locally. Good example in the area of a well-cared for landscape or set of features that combine to give a clearly defined sense of place.
Low	Landscape characteristics or features which are reasonably tolerant of change without determent to their present character. No designation present or of little local value. An example of an un-stimulating landscape or set of features; with some areas lacking a sense of place and identity.
Medium	Noticeable change, affecting some key characteristics and the experience of the landscape; and Introduction of some uncharacteristic elements
High	Noticeable change, affecting many key characteristics and the experience of the landscape; and Introduction of many incongruous developments
Very High	Highly noticeable change, affecting most key characteristics and dominating the experience of the landscape; and Introduction of highly incongruous development

It's considered that the Proposed Development changes to landscape characteristics are Medium to High.

10.2.5.2 Visual Effects

Visual effects are determined by the extent of visibility and the nature of the visibility (i.e., how a development is seen within the landscape); for example, whether it appears integrated and balanced within the visual composition of a view or whether it creates a focal point. Negative visual effects may occur through the intrusion of new elements into established views which are out of keeping with the existing structure, scale and composition of the view. Visual effects may also be beneficial, where an attractive focus is created in a previously unremarkable view, or the influence of previously detracting features is reduced. The significance of effects will vary, depending on the nature and degree of change experienced and the perceived value and composition of the existing view.

Receptors

For there to be a visual impact, there is the need for a viewer. Views experienced from locations such as settlements, recognised routes and popular vantage points used by the public have been included in the assessment. Receptors are the viewers at these locations. The degree to which receptors, i.e., people, will be affected by changes as a result of the Proposed Development depends on a number of factors.

Value of the View

Value of the view is an appraisal of the value attached to views and is often informed by the appearance on Ordnance Survey of tourist maps and in guidebooks, literature or art. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view is also an indicator. The value of the view is determined with reference to the definitions outlined in Table 10-5:

Table 10-5: Value of the View

Value	Classification Criteria
High	Nationally recognised view of the landscape, with no detracting elements.
Medium	Regionally or locally recognised view, or unrecognised but pleasing and well composed view, with few detracting elements.
Low	Typical or poorly composed view often with numerous detracting elements.

Visual Susceptibility

The Landscape Institute, '*Guidelines for Landscape and Visual Impact Assessment*', (3rd Edition. 2013) identify that the susceptibility of visual receptors to changes in views and visual amenity is a function of:

- The occupation or activity of people experiencing the view at a particular location; and
- The extent to which their attention or interest may therefore be focused on the views and visual amenity they experience at particular locations.

For example, residents in their home, walkers whose interest is likely to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience often indicate a higher level of susceptibility. Whereas receptors occupied in outdoor sport, where views are not important, or at their place of work, are often considered less susceptible to change. Visual susceptibility is determined with reference to the three-point scale and criteria outlined in Table 10-6.

Table 10-6: Visual Susceptibility

Susceptibility	Classification Criteria
High	Receptors for which the view is of primary importance and are likely to notice even minor change.
Medium	Receptors for which the view is important but not the primary focus and are tolerant of some change.
Low	Receptors for which the view is incidental or unimportant and is tolerant of a high degree of change.

Visual Sensitivity

Sensitivity to change considers the nature of the receptor; for example, a person occupying a residential dwelling is generally more sensitive to change than someone working in a factory unit. The importance of the view experienced by the receptor also contributes to an understanding of the susceptibility of the visual receptor to change as well as the value attached to the view. A judgement is also made on the value attached to the views experienced. This takes account of:

- Recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;
- Indicators of the value attached to views by visitors, for example through appearance in guidebooks or on tourist maps, provision of facilities for their enjoyment (sign boards, interpretive material) and references to them in literature or art; and
- Possible local value: it is important to note that the absence of view recognition does not preclude local value, as a view may be important as a resource in the local or immediate environment due to its relative rarity or local importance.

The visual sensitivity to change is based on interpretation of a combination of all or some of the criteria outlined in Table 10- 7:

Table 10-7 Visual Sensitivity

Visual Sensitivity	Criteria
High	Users of outdoor recreational facilities, on recognised national cycling or walking routes or in national designated landscapes. Dwellings with views orientated towards the Proposed Development.

Visual Sensitivity	Criteria
High – Medium	Users of outdoor recreational facilities, in locally designated landscapes or on local recreational routes that are well publicised in guidebooks. Road and rail users in nationally designated landscapes or on recognised scenic routes, likely to be travelling to enjoy the view.
Medium	Users of primary transport road network, orientated towards the Development, likely to be travelling for other purposes than just the view. Dwellings with oblique views of the Proposed Development.
Medium – Low	People engaged in active outdoor sports or recreation and less likely to focus on the view. Eg: outdoor workers – agriculture, horticulture Primary transport road network and rail users likely to be travelling to work with oblique views of the Development or users of minor road network.
Low	People engaged in work activities indoors, with limited opportunity for views of the Development.

Magnitude of Visual Change

Visual effects are direct effects as the magnitude of change within an existing view will be determined by the extent of visibility of the Proposed Development. The magnitude of the visual effect resulting from the Proposed Development at any particular viewpoint or receptor is based on the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described below:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development;
- The degree of contrast or integration of any new features or changes in the landscape form, scale, mass, line, height, skylining, back-grounding, visual clues, focal points, colour and texture;
- The nature of the view of the Proposed Development, in relation to the amount of time over which it will be experienced and whether views will be full, partial or glimpses;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from the Proposed Development and the extent of the area over which the changes will be visible; and
- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

The magnitude of visual effect resulting from the Proposed Development at any particular viewpoint or receptor is based on the interpretation of the above range of factors and is set out in Table 10- 8:

Table 10-8 Magnitude of Visual Change (Visual effects)

Magnitude	Criteria
Very High	The Proposed Development will cause significant changes in the existing view over a wide area or a change which will dominate over a limited area.
High	The Proposed Development will cause a considerable change in the existing view over a wide area or a significant change over a limited area.
Medium	The Proposed Development will cause modest changes to the existing view over a wide area or noticeable change over a limited area.
Low	The Proposed Development will cause very minor changes to the view over a wide area or minor changes over a limited area.
Negligible	The Proposed Development will cause a barely discernible change in the existing view.
None	No change in the existing view.

10.2.6 Duration and Quality of Effects

Table 10-9 provides the definition of the duration of landscape and visual effects:

Table 10-9 Definition of the duration of landscape and visual effects

Duration	Description
Temporary	Impacts lasting one year or less
Short-term	Impacts lasting one to seven years
Medium-term	Impacts lasting seven to twenty years
Long-term	Impacts lasting twenty to fifty years
Permanent	Impacts lasting over fifty years

The quality of both landscape and visual effects can be Beneficial (Positive), Adverse (Negative) or Neutral according to the definitions set out in Table 10-10:

Table 10-10 Definition of Quality of Effects

Class	Criteria
Positive:	A positive impact which will improve or enhance the landscape character or viewpoint.
Neutral	A neutral impact which will neither enhance nor detract from the landscape character or viewpoint.
Negative	A negative impact which will detract from the existing landscape character or viewpoint.

10.2.7 Significance Criteria

The objective of the assessment process is to identify and evaluate the potentially significant effects arising from the Proposed Development. The assessment will identify the residual effects likely to arise from the finalised design considering mitigation measures and the change over time. The significance of effects is assessed by considering the sensitivity of the receptor and the predicted magnitude of effect in relation to the baseline conditions. In order to provide a level of consistency and transparency to the assessment and allow comparisons to be made between the various landscape and visual receptors subject to assessment, the assessment of significance is informed by pre-defined criteria as outlined in the Table 10-11. When assessing significance, individual effects may fall across several different categories of significance and professional judgement is therefore used to determine which category of significance best fits the overall effect on a landscape or visual receptor. The significance of the effects can be adverse (negative) or beneficial (positive) according to the definitions set out in Table 10- 11.

Table 10-11 Categories of Significance of Landscape and Visual Effects

Impact Magnitude	Definition
Imperceptible Impact:	An impact capable of measurement but without noticeable consequences
Minor Impact:	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact:	An impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends
Significant Impact:	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact:	An impact which obliterates sensitive characteristics

10.2.8 Viewsheds

Viewsheds were defined in 5 different points on the site of the Proposed Development (V1-V5), as it can be seen in the images 10-1 to 10-5. These Viewsheds were processed using *Google Earth Pro* software, that adjusted the view of the observer 2.00 meters above the terrain.

In green, in the images, it can be seen the visibility from the considered points.

Screening of the existing vegetation is not considered in these Viewsheds.

After reviewing the Viewsheds it can be concluded that the main visibility to the Site is within a radius of 2km. Visibility beyond *Riverstown Cross* to the west is very limited, as is visibility beyond *Rathkenny Road* to the east.

There is no visibility to the south from R163 nor to the north from *Castletown*.

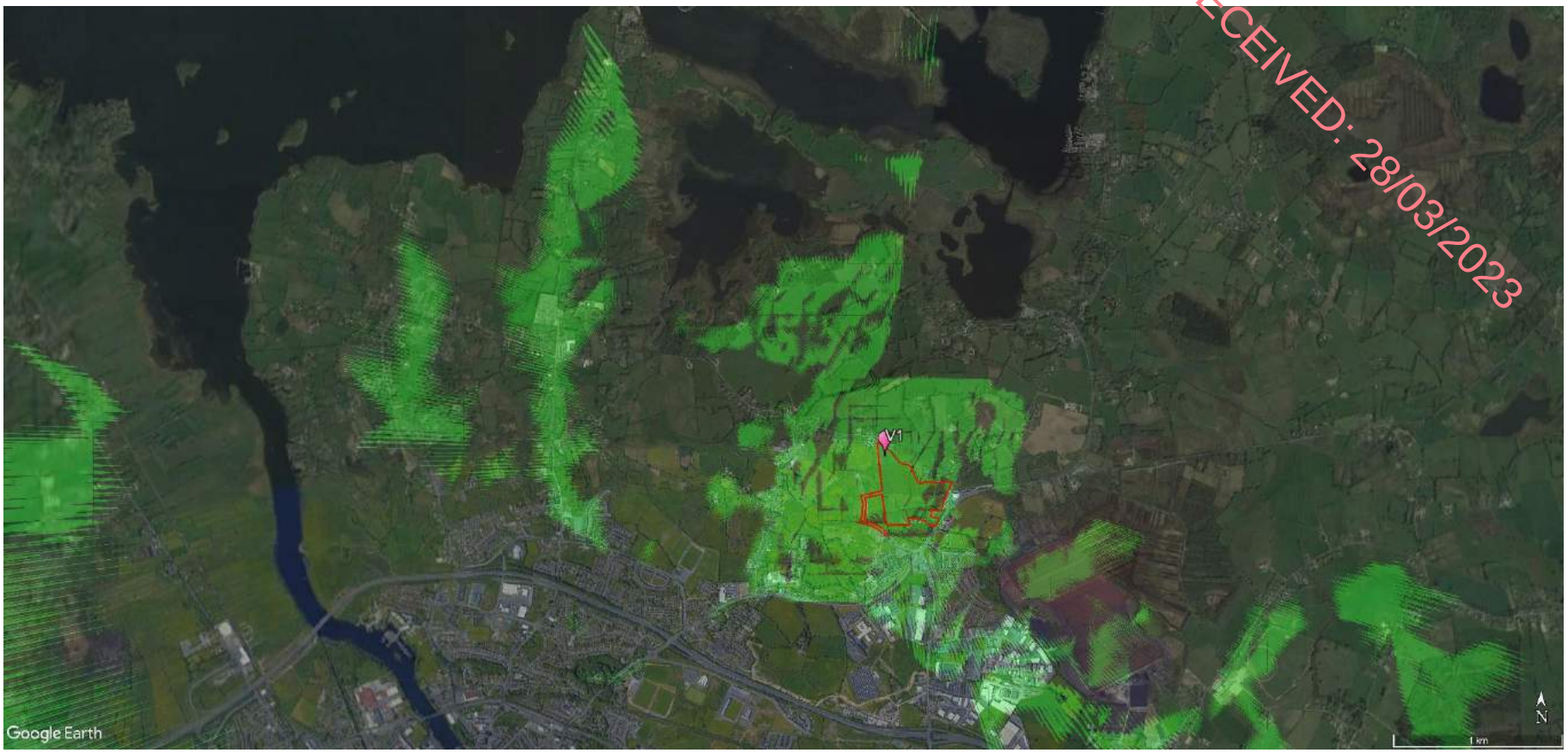


Figure 10-1: Viewshed V1. Proposed Development outlined in red. Viewing altitude: 8.00 km

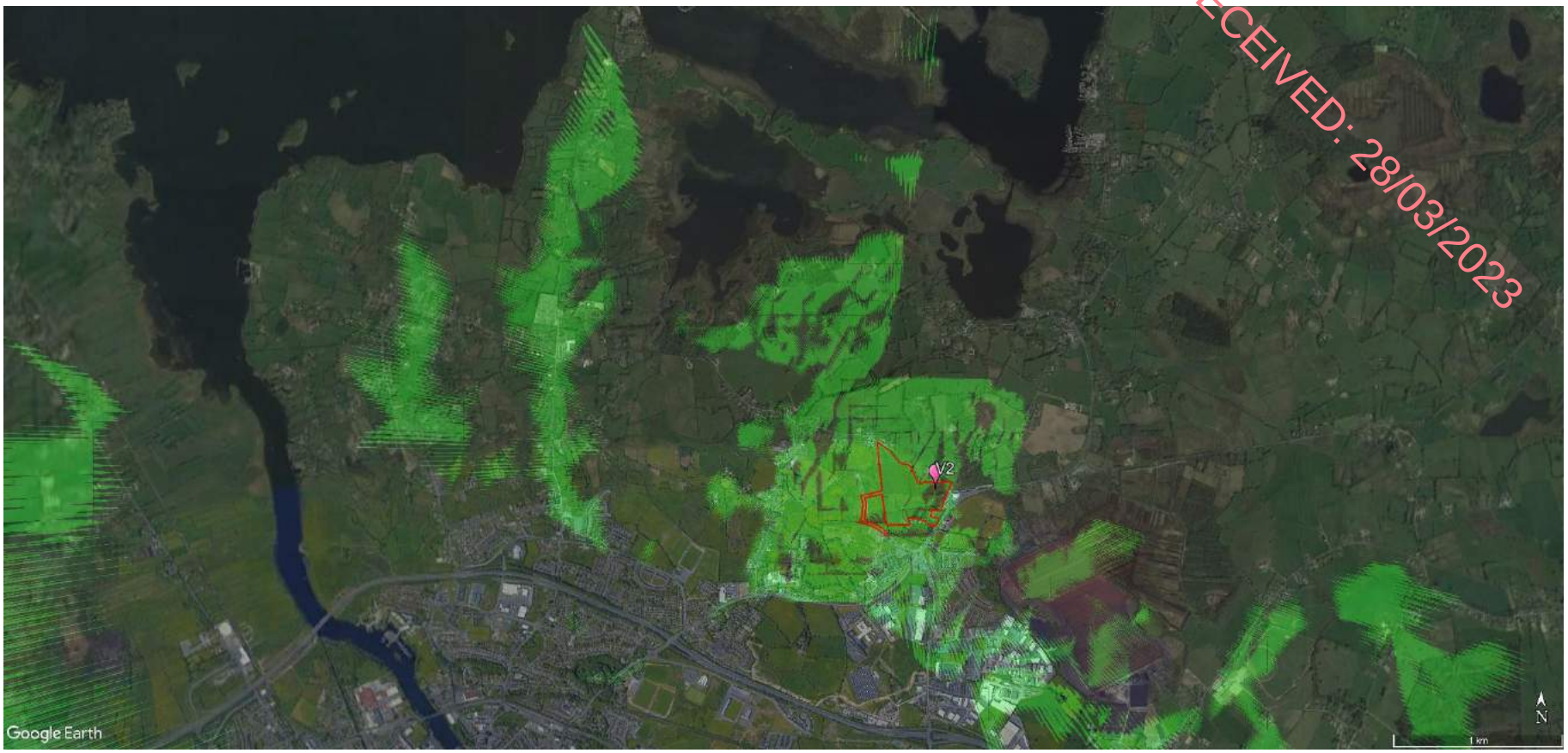


Figure 10-2: Viewshed V2. Proposed Development outlined in red. Viewing altitude: 8.00 km

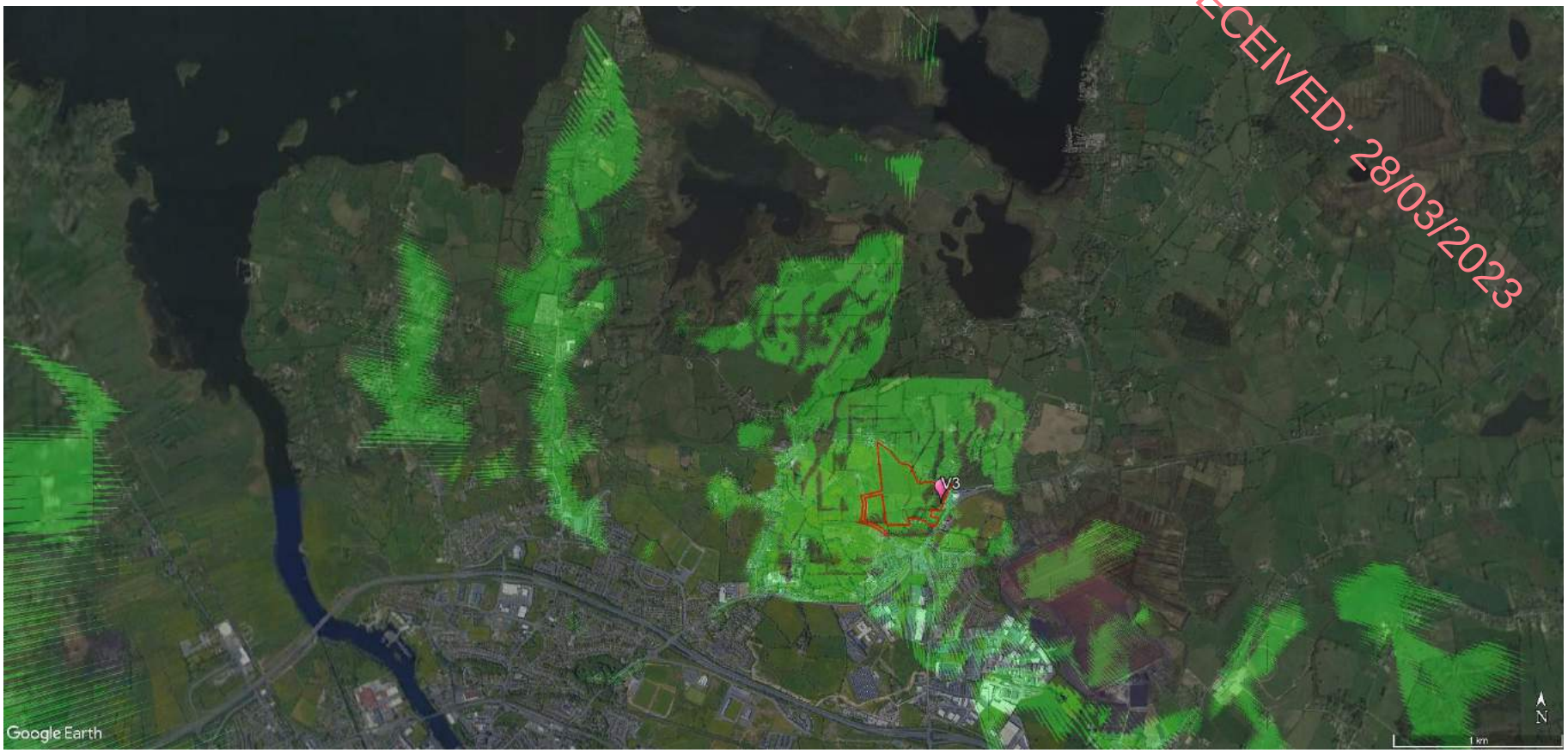


Figure 10-3: Viewshed V3. Proposed Development outlined in red. Viewing altitude: 8.00 km

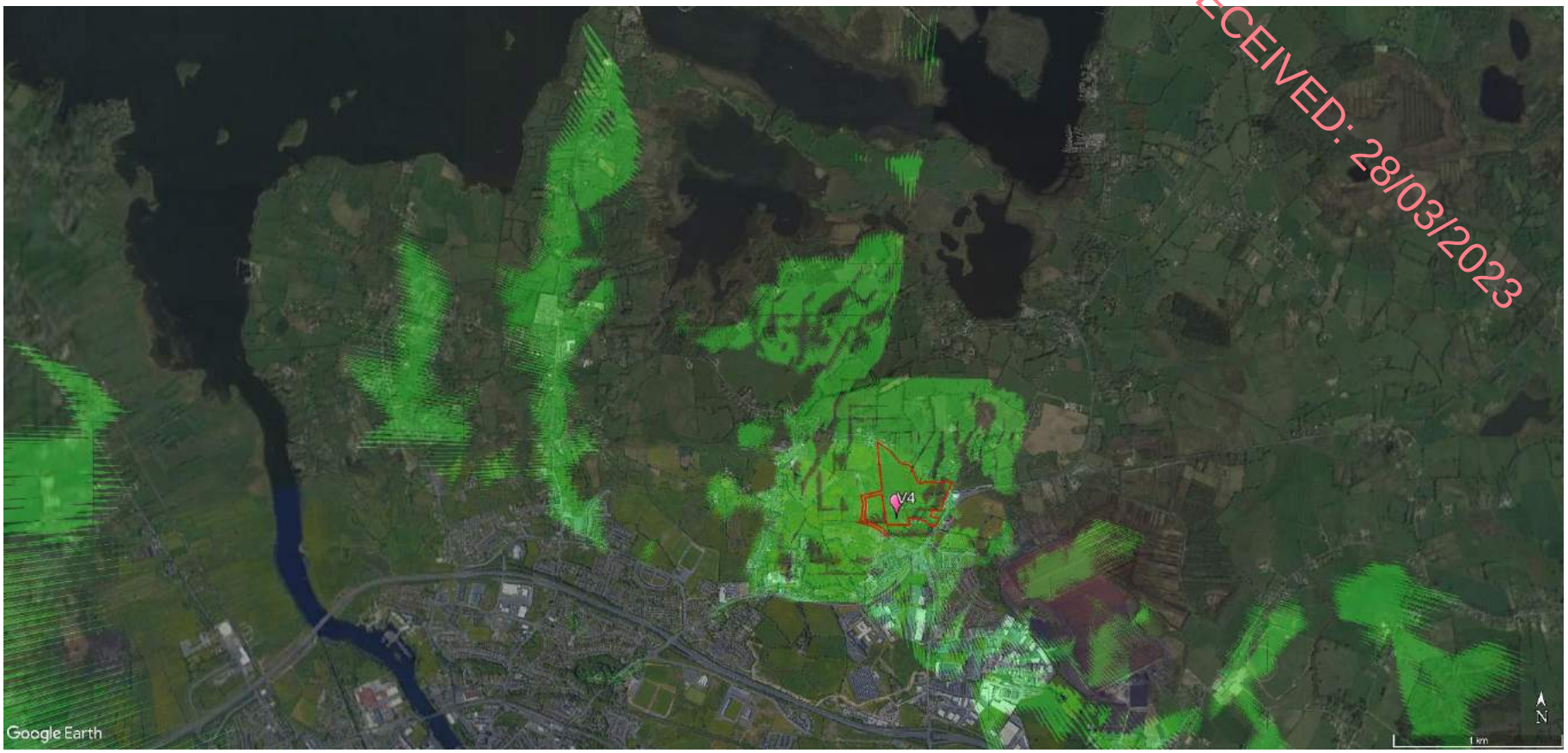


Figure 10-4: Viewshed V4. Proposed Development outlined in red. Viewing altitude: 8.00 km

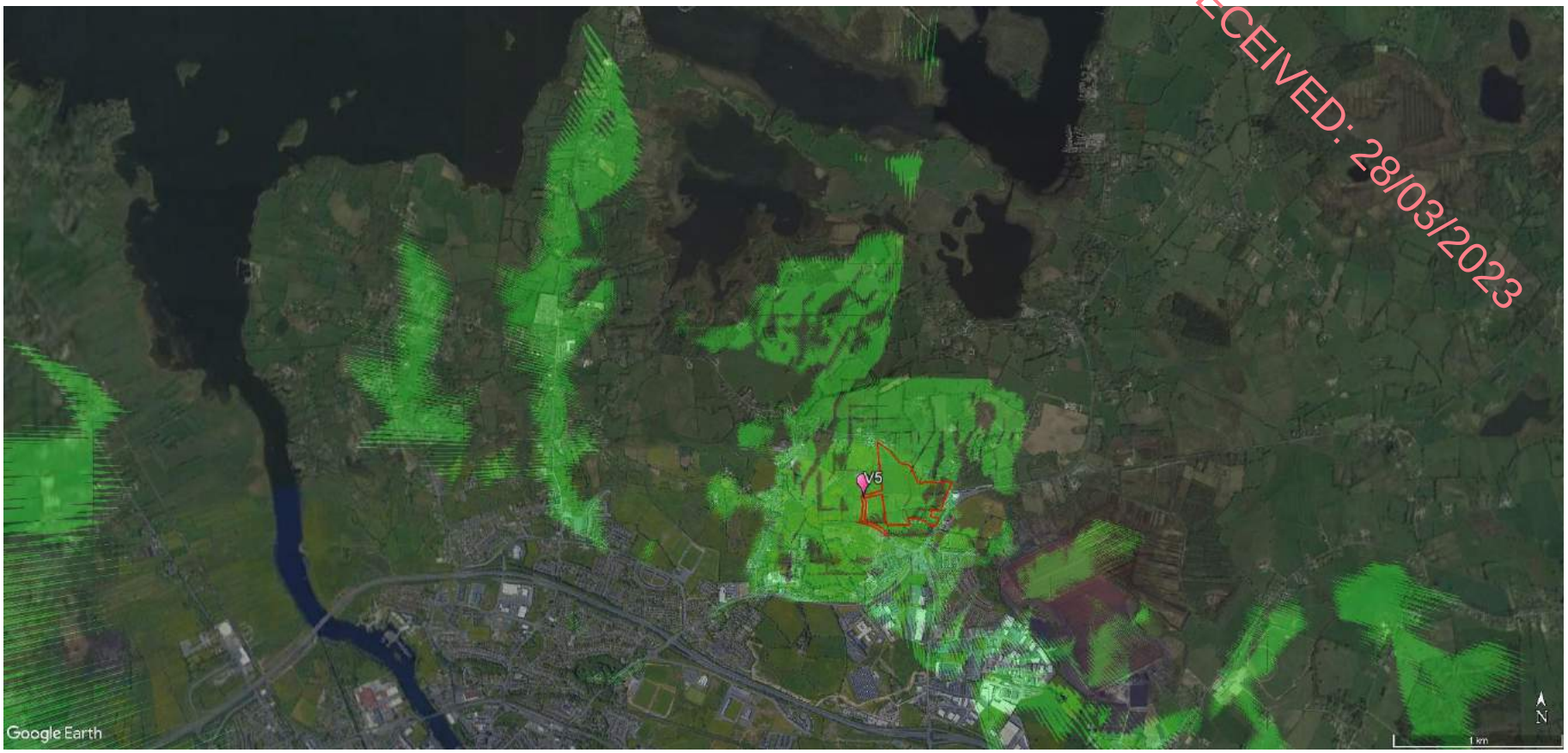


Figure 10-5: Viewshed V5. Proposed Development outlined in red. Viewing altitude: 8.00 km

10.2.9 Study Area

The viewsheds analysis identified a wide geographical area from where the Proposed Development had visibility. The ZTV was adjusted by field study, desk studio and using standardised viewpoint distances from the source of impact.

Due to the scale and nature of the Proposed Development within this receiving landscape setting, it is anticipated that the Proposed Development is not likely to give rise to significant landscape or visual impacts beyond approx. 1km. However, as a precaution, a 3.0km-radius study area is used in this instance.

As one moves away from any type of development in the landscape, it will become less perceptible with distance. It is common practice to consider the viewpoint distance as laid out in Table 10–12 Viewpoint Distance, below.

Table 10-12 identifies and describes the impact of a viewpoint and the distances associated with these visual impacts.

Table 10-12 Viewpoint Distance

Viewpoint Distance	Description
0-2km	It is generally accepted that a development located approximately 2km or less from a viewer would be close enough to allow identification of significant detail. Any positions within this range with open uninterrupted views of a development would generally receive the greatest visual impacts.
2-5km	At this distance, visibility of a development site becomes more general, with viewers in open uninterrupted positions able to identify general form, colour/tone and textural contrast, but losing the more focused detail achievable from closer positions. Impacts at this distance are generally less than those found between 0-2km.
5-10km	Beyond 5km visual prominence quickly diminishes. Certain circumstances/light conditions etc. have potential to allow certain types of development and material finishes to be perceived. The development increasingly becomes part of the general background/distance views. Upwards of 15km distance, developments quickly become minor features within the landscape and considered imperceptible to the average human eye. The impact of the development diminishes as the developments becomes part of the general background/distance views.

10.2.10 Potential Visual Receptors

Impacts on potential receptors have been assessed in sections 10.2.10.1 to Section 10.2.10.5. This assessment has been informed by the Viewsheds and Photomontage Report.

10.2.10.1 Dwellings with views orientated towards the development

Dwellings with views orientated towards the Proposed Development are generally accepted as having a high visual sensitivity.

There are 3 dwellings next to the southeast limit of the Site, on the other side of the road that begins on N55. The existing hedgerow at the southern boundary of the Site screens the visibility from these dwellings into the interior of the Site.

There are 6 dwellings on the north side of the *Garnafeiliagh* road that defines the northern limit of the Site.

There is 1 dwelling on the northeast of the Site on the other side of the Bullet Road, and 2 dwellings on the southeast of the Site, on the other side of the N55.

On the east of the Proposed Development the *Colm Quinn BWM Athlone* building has a great visual and landscape impact since is just on the opposite side of the Blyry Ct., that makes the eastern limit of the site of the Proposed Development.

To the west of the Site there is a large agricultural area, with dwellings about 500 meters beyond that area.

There are several settlements defined in the broader landscape, mainly to the south in the *Woodville Grange* area (100 meters from the Site), the *Drumacoon* area (80 meters from the Site) and *Garnafaliagh* area (500 meters from the Site). There are also some scattered dwellings along the Bullet Road, to the northeast.

The town of Athlone is about 1.40 km from the Site.

10.2.10.2 Users of the High Amenity areas

Lough Ree High Amenity Area, defined in *Westmeath County Development Plan 2021-2027,* is located 200 meters north of the Proposed Development.

Lough Ree is the second largest lake in the *River Shannon System* after *Lough Derg*. It forms part of the *Shannon Navigation System* within Athlone, the most important settlement and service centre on the Shannon system in the region. Lough Ree has long been recognised as a national treasure in terms of its habitat, archaeology and water-based recreation. The sheer scale of the body of water, the historical associations with its islands, the complexity of the indented and diffuse shoreline and the spatial arrangement of the more hidden inner lakes give this lake uniqueness.

The surrounding lands are composed of a matrix of wetlands, peatlands, undulating farmland, sporadic single house developments interspersed with pockets of extractive development and other small local enterprises.

Lough Ree is of great significance in terms of tourism and recreation both nationally and internationally. Further built development should aim to consolidate and manage what is already in place with the enhancement of access, lakeside walkways, and the upgrading of existing infrastructure a priority. Water quality should not be further deteriorated, and the bulk of tourism related growth should be directed to Athlone. The Inner Lough's are considered to be particularly vulnerable in terms of water quality due to a slower turnover.

The following measures, that are foreseen in the *Westmeath County Development Plan 2021-2027*, are highlighted:

CPO 13.49 - Protect and sustain the established appearance and character of views over Killinure Lake and Lough Ree and beyond.

CPO 13.51 - Ensure that development and activities that are immediately adjacent to the Lough Ree driving route, sustain the established appearance and character of views that contribute to the distinctive quality of the landscape.

CPO 13.52 - Ensure that development proposals avoid significant adverse effects in the foreground of views from the Lough Ree Driving Route.

CPO 13.53 - Sustain the established appearance and character of views over the surrounding countryside while facilitating the continued development of uses that sustain the activities that give rise to the appearance and character of the landscape.

10.2.10.3 Outdoor workers

People engaged in outdoor work are not likely to focus on the surrounding view thus having medium to low visual sensitivity.

10.2.10.4 Road / transport users

Users of the main roads around the Proposed Development are generally accepted as having medium to low visual sensitivity.

The N55 (*Ballymahon Road* in the closest section to the Site), located southeast of the Site, travels in a south / north direction and provides a link between Athlone and Cavan.

The L8048, located south of the Site, will provide access to the Proposed Development.

Blyry Ct. is located east of the Site and *Garnafeliliagh road* on the northern limit of the Site.

N55 connects with the R916/Woodville Road on the roundabout located 250 meters from the Site. This road then connects to the N6, 1200 meters from the Site.

10.2.10.5 Indoor workers

People engaged in work activities indoors, with limited opportunity for views of the development are accepted as having a low visual sensitivity. It is predicted no negative visual impact to these types of receptors.

10.3 The Existing and Receiving Environment (Baseline Situation)

10.3.1 Site Context

The site of the Proposed Development is located on Cornamaddy and Ballykeeran Townlands, Electoral Division of Moydrum, in Civil Parish of St Mary's, in the Barony of Brawny, in the County of Westmeath.

The site is residentially zoned and located to the north east of Athlone Town accessed via the N55. The site is one of the few significant parcels of zoned land in close proximity to Athlone on the north east side of the town. The Site is a suburban Greenfield Site (12.28 ha – Application Site Area) with a proposed developed residential site area of 9.49 ha. The site is bounded to the east by the N55, a rural country road to the North and residentially zoned lands to the west.

The Site is in close proximity to Athlone employment areas, with the Blyry Industrial Estate located nearby the Site and several employment areas all within 2km. Being accessed

currently via L8048 the Site is highly accessible by foot, bicycle and car. A continuous footpath also connects the Site via N55 to the town centre and to nearby leisure and community facilities. Immediately adjacent to the Site boundary is the BMW Athlone site and residential developments.

The Site is currently a green field site with hedgerows and there is a ditch containing a watercourse running through the centre of the Site.

The local context is defined by a combination of residential, commercial and civic land uses, with the significant Blyry Industrial Estate nearby. Currently the site is characterized by open and undulating farm land with hedgerows along the perimeter. Being a low-lying Site, views of the site are confined to the immediate locality.

The following points were considered relevant in the broader landscape, and can be seen in the Figure 10-6:

1 - Athlone

2 – Blyry Industrial Estate

3 - N6

4 - N55

5 - Shannon River

6 - Ree Lough

7 - Coosan Lough

8 – Athlone Regional Sports Centre

9 - Killinure Lough

10 - Hare Island

11 - Wineport

12 - Newforest

13 - Ballykeeran

14 - Detached four-bay single-storey vernacular house in *Ballykeeran* (Protected Structure)

15 - Detached four-bay single-storey thatched cottage in *Ballykeeran* (Protected Structure)

16 - Detached three-bay single-storey former gate lodge with attic level in *Ballaghkeeran Little* (Protected Structure)

17 - Protected View 1: View over *Lough Ree* from parking/picnic area

18 - Protected View 2: Views of *Lough Ree* from *Coosan* waterfront

19 - R446

20 - Garnafailagh

21 – Department of Education & Skills

22 - Coosan Cemetery

23 – Cornamagh Cemetery

24 - Custume Pitch and Putt Club Athlone

Figure 10-6: Aerial view with the site of the Proposed Development outlined in red in its broader landscape context. Viewing altitude: 11.00 km. Source: Google Earth

10.3.2 Designation and Zoning

The lands across the Proposed Development site are zoned "*Residential*" (red), "*Open Space*"(green) and "*Existing Residential*" (purple), under the *Athlone Town Development Plan 2014-2020*, as it can be seen of Figure 10-7.

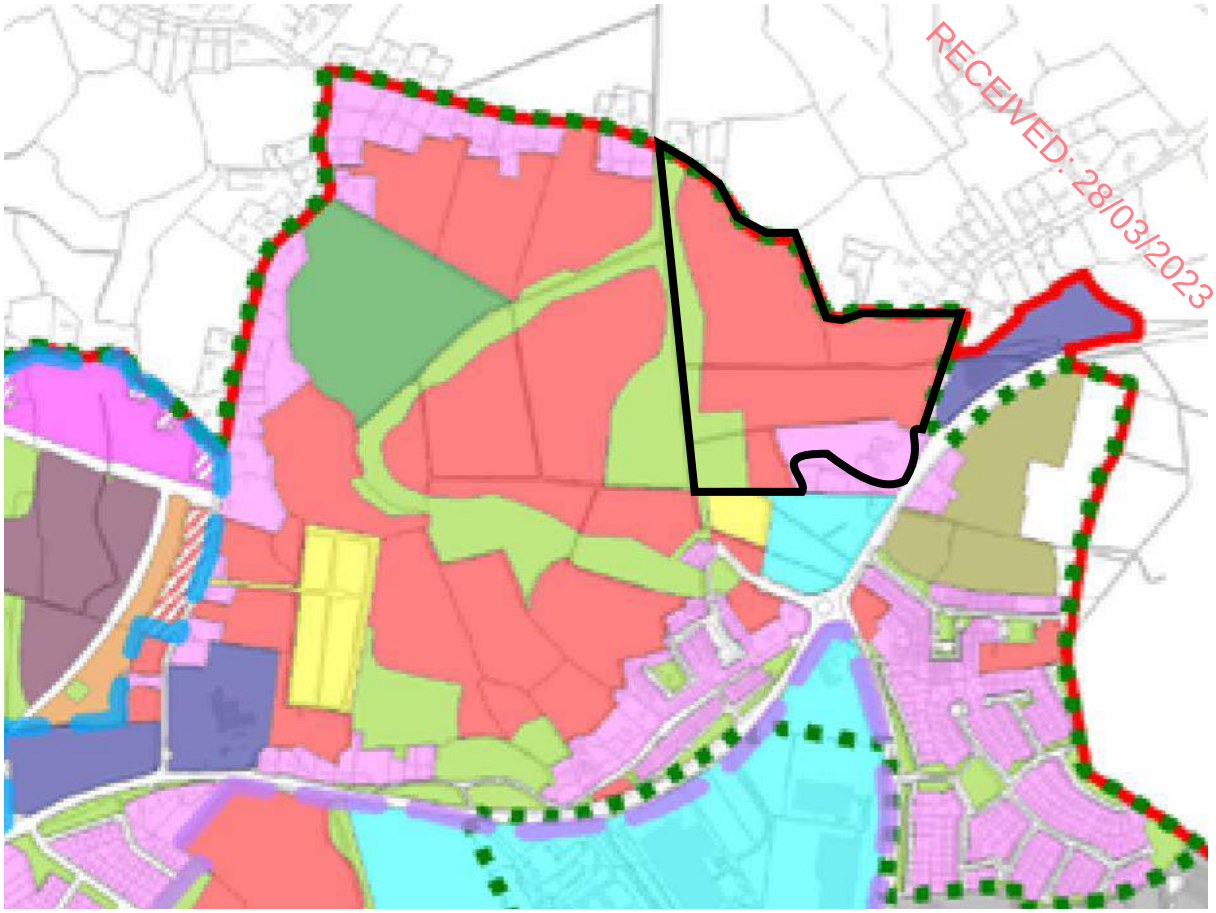


Figure 10-7: Extract from the Land Using Map of Athlone Town Development Plan 2014-2020 (new version still not available). Site of the Proposed Development outlined in black

In terms of Land Use Zoning Objectives, and within the site of the Proposed Development, the following objectives are noted:

- Residential: "*To provide for residential development, associated services and to protect and improve residential amenity*".
- Open Space: "*To provide for, protect and improve the provision, attractiveness, accessibility and amenity value of public open space and amenity areas*".

10.3.3 Landscape Character of the site

The Landscape Character Type that defines the area of the site of the Proposed Development is **Character Area 6 Lough Ree/Shannon Corridor**, as can be seen in Figure 10-8.

This area includes Lough Ree, the Shannon corridor both north and south of Athlone and associated callows. To the east of the area, Waterstown Lake, Lough Mareegan and the lakeside villages of Ballykeeran, Glasson and Tubberclare are also included. Areas of pastureland are scattered throughout the remainder of the area along with small patches of inland marshes, coniferous forestry and other agricultural uses. A significant area of intact bog remains to the southeast of Athlone and worked out peatland areas are located to the north and south of the Character Area, adjacent to the callows and Lough Ree.

The area has significant conservation status, as SPA, SAC and NHA are all present therein. The Shannon and Lough Ree are important in terms of their recreational and amenity value,

as well as their natural heritage importance, thus the quality of these assets must be protected. As development pressure increases around the lakeshore and floodplain, the risk of landscape deterioration also increases.

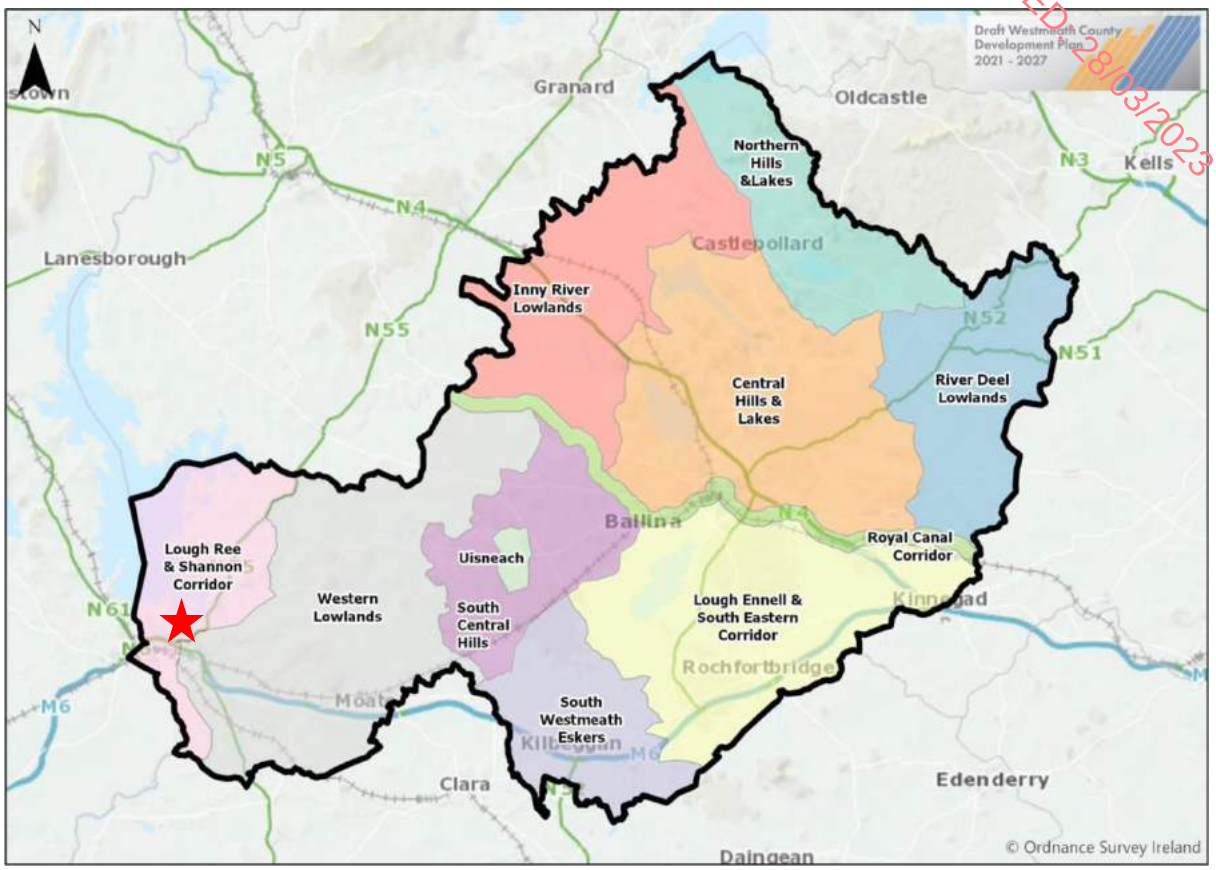


Figure 10-8: Landscape Character types. Map from the Westmeath County Development Plan 2021-2027. Site marked with a star

The Site is excluded from any "*Special Area of Conservation*" of the County, as seen in Figure 10-9.

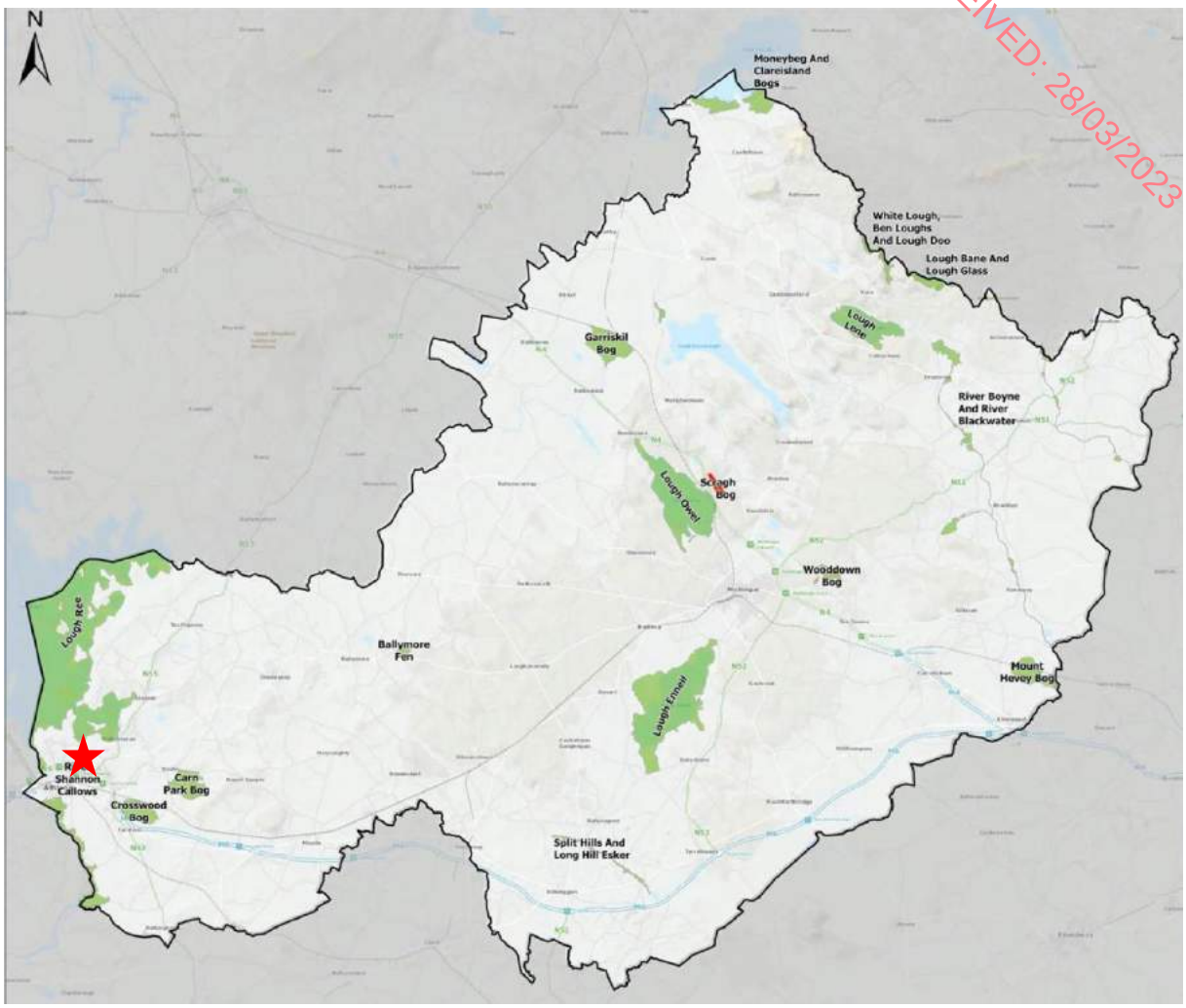


Figure 10-9: Special Areas of Conservation. Map from the Westmeath County Development Plan 2021-2027. Site marked with a star

The Site is excluded from any "*Special Protection Area*" of the County, as seen in Figure 10-10.

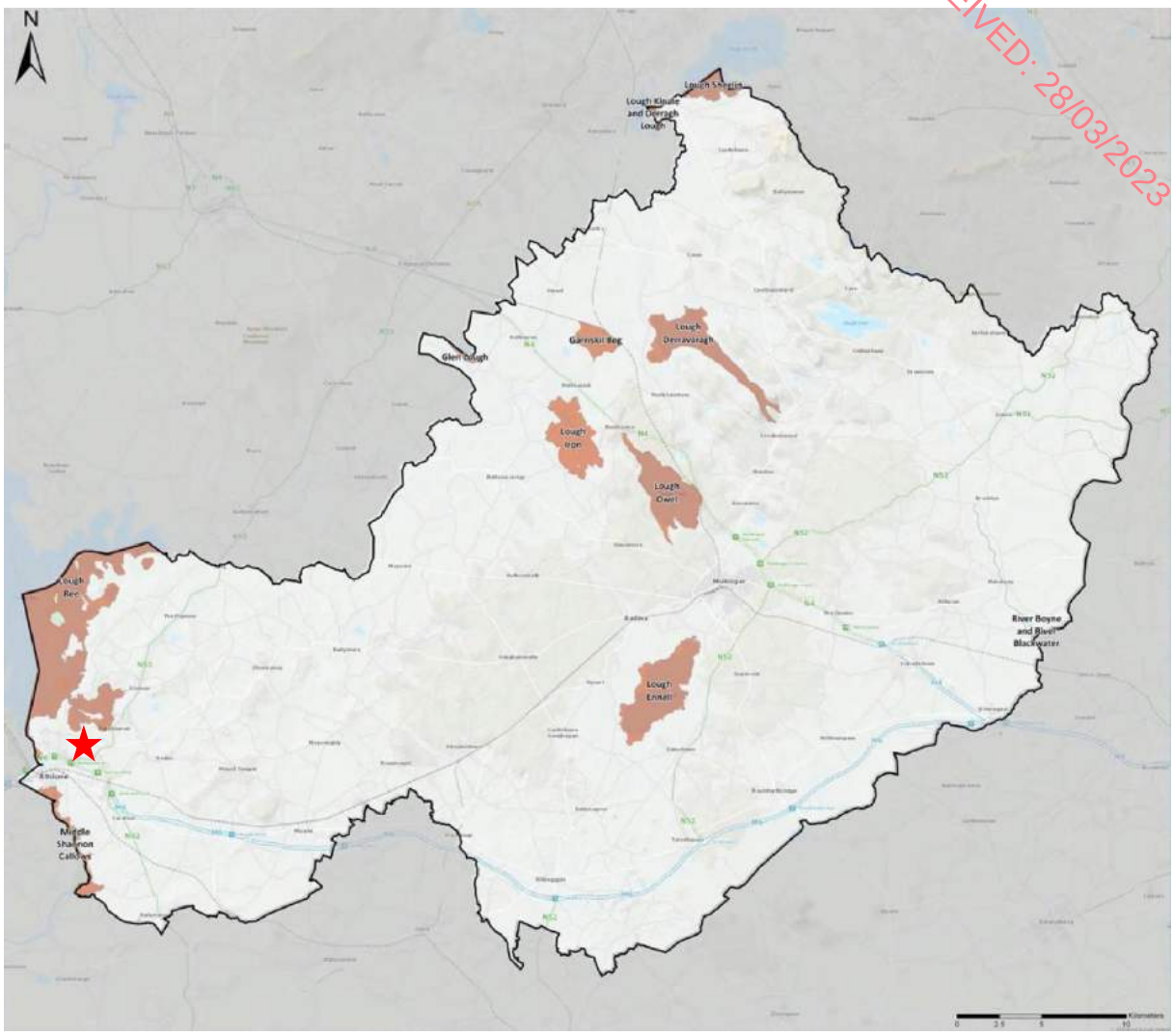


Figure 10-10: Special Protection Areas. Map from the Westmeath County Development Plan 2021-2027. Site marked with a star

The Site is excluded from any "*High Amenity Area*" of the County, as seen in Figure 10-11.

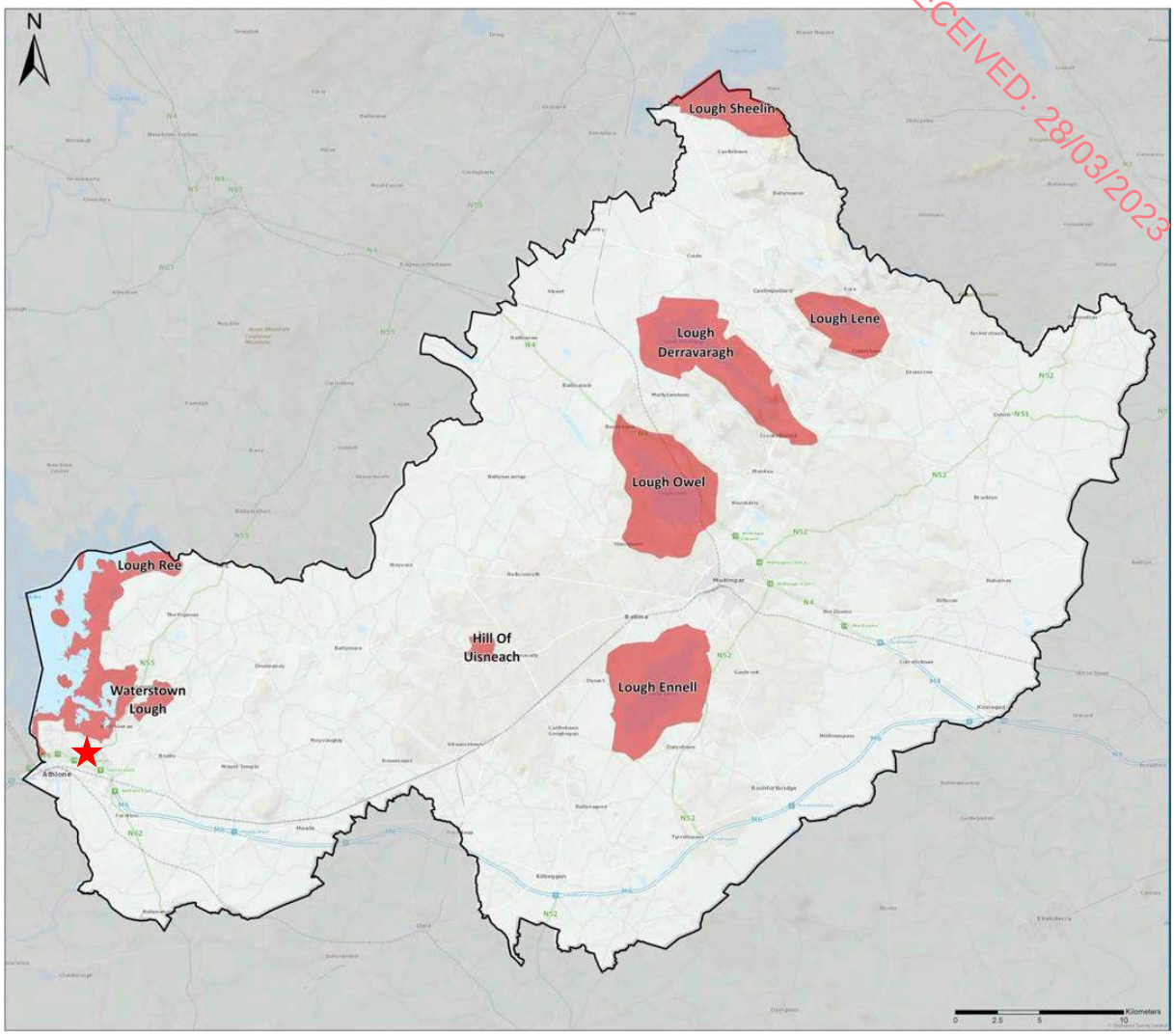


Figure 10-11: Special Protection Areas. Map from the Westmeath County Development Plan 2021-2027. Site marked with a star

The Site is excluded from any "*Natural Heritage Area*" of the County, as seen in Figure 10-12.

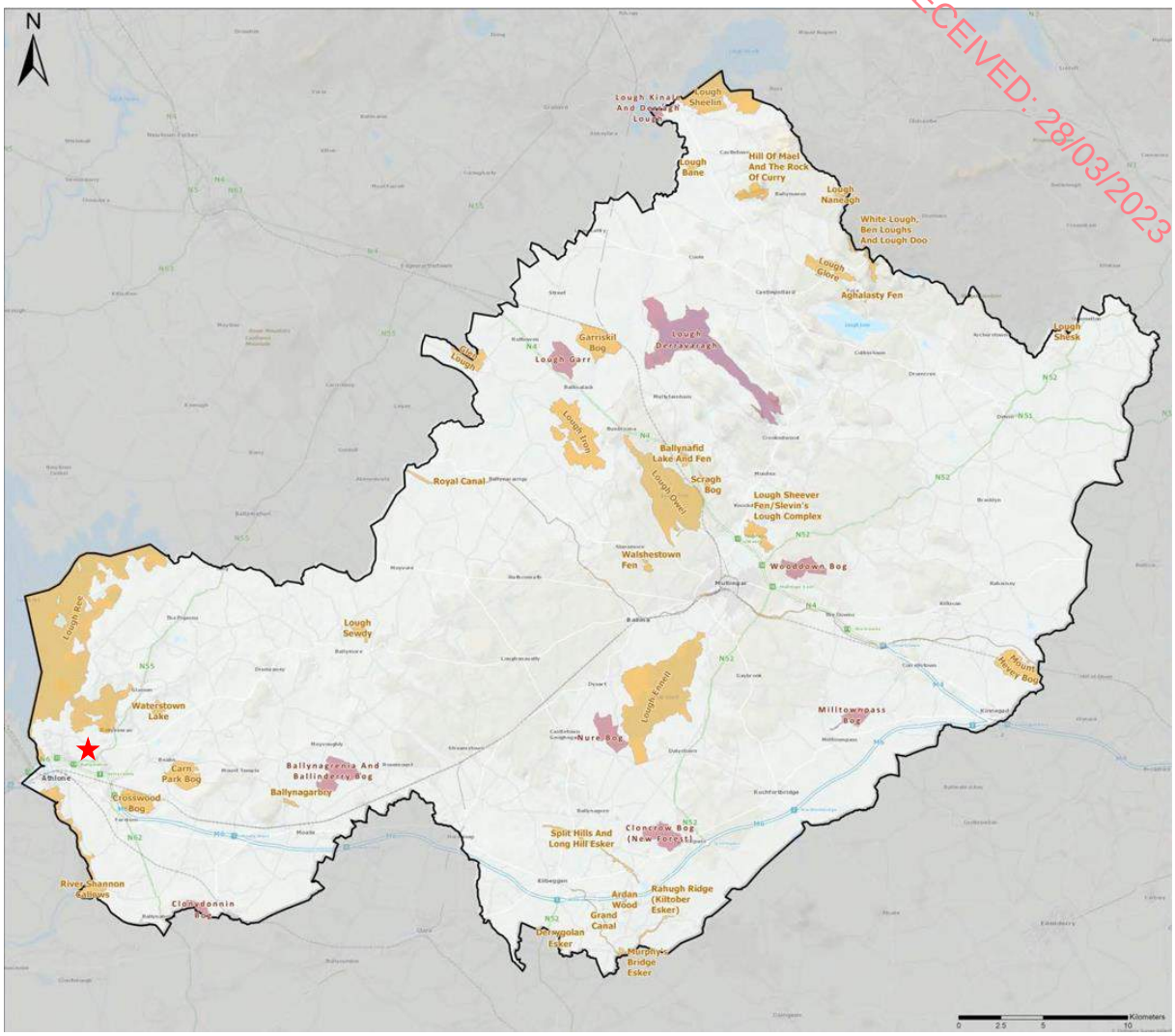


Figure 10-12: Westmeath Natural Heritage Areas*. Map from the Westmeath County Development Plan 2021-2027. Site marked with a star*

10.3.4 Landscape Sensitivity

Landscape sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values.
Within the Westmeath County Development Plan, this area is deemed be of Medium Landscape Value, Medium Landscape Sensitivity and Local Landscape Importance.

10.3.5 Existing landscape

As can be seen in Figure 10-13, the desk study revealed that a number of different elements on the ground have a bearing on the visibility of the Proposed Development:

- The Site is currently a mix of a greenfield site and agricultural fields, criss-crossed by hedgerows;
- There is a water stream (*Garrynafela Stream)* that runs along the western Site boundary and transects the Site, flowing east to west;

- The Site is bounded by hedgerows from almost all boundaries, that prevent most of the visibility for the interior of the Site. The only exception is on the eastern boundary that have several openings in the transition with the *Blyry Ct*;
- The setting is in a residential area with surrounding land uses of agriculture, and some green areas. There are dense residential areas, south of the Site, mainly east of the R916 Road;
- The *Colm Quinn BMW Athlone* building and car parking, east of the Site, turns out to be the most prominent element in the surrounding landscape.

Figure 10-13: Aerial View with the limits of the Proposed Development in red
Source: Google Earth

10.3.6 Habitats

According to the Biodiversity chapter, the habitats within the Site are coded and categorised for the most part as per Fossitt (2000) and are described in detail in the following sections. The habitat map of the Site is shown in .

Figure 10-14, the habitats at the Site are listed and described below:

- WL1 – hedgerows
- WL2 – treelines
- WD1 – mixed broadleaved woodland

- WS2 – immature woodland
- WS1 – scrub
- GA1 – improved agricultural grassland
- GS2 – dry meadows and grassy verges
- GS4 – wet grassland
- FW2 – depositing/lowland rivers
- FW4 – drainage ditch

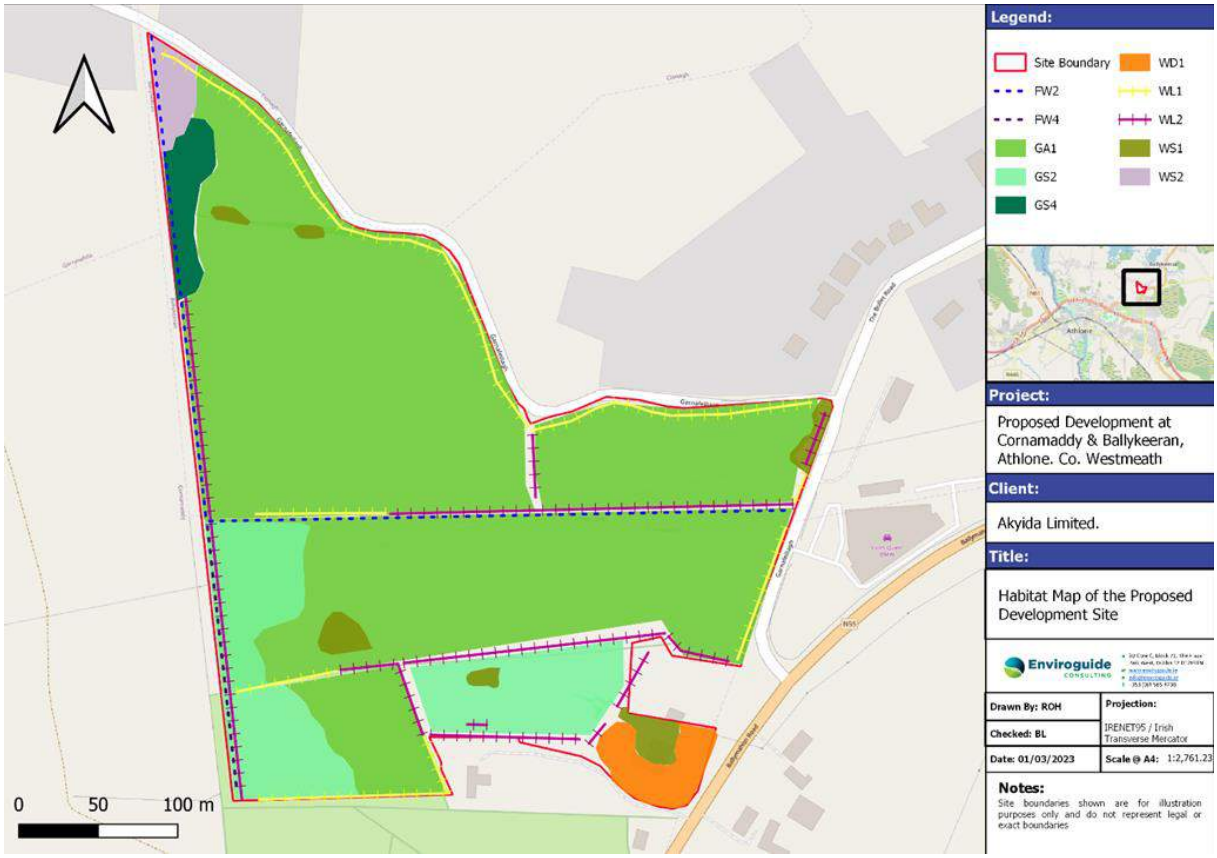


Figure 10-14: Habitat Map of the Proposed Development. Source: Biodiversity Chapter

Of these habitats, and considering the landscape value of the Site, the following are highlighted:

WL1 – hedgerows and WL2 – treelines

The various fields on Site are bound by hedgerow and treeline habitats. These hedgerows and treelines are predominantly mature in nature and contain common species (described in the Biodiversity chapter). Although the species recorded within the hedgerows and treelines on Site are common and widespread, these linear habitats are considered of High ecological value at a local scale due to the size and maturity of the trees present and the habitat connectivity provided by these features at the Site.

WD1 – mixed broadleaved woodland

A small area of mixed semi-mature broadleaved woodland is present within a derelict portion of the Site to the southeast. Some ornamental trees are present within this habitat that were likely planted in the past but are now suppressed by the larger neighbouring self-seeded trees.

FW2 – depositing/ lowland river

The *Garrynafela Stream* is mapped by the EPA as running along the western Site boundary and transecting the Site, flowing east to west and south to north. This waterbody was heavily shaded in places due to the boundary treelines and hedgerows. A drainage ditch lies south of this Stream along the south-easter boundary and is hydrologically connected. Given the connectivity between the *Garrynafela Stream* and *Lough Ree*, the *Garrynafela Stream* and drainage ditches on Site are considered of High ecological value at a local scale.

10.3.7 Protected Views and Scenic Routes

A. Protected Views

There are 2 Protected views defined by the Westmeath County Development Plan in the broader landscape (Protected Views 1 and 2), as can be seen in Figure 10-15.

Protected view 1

View over Lough Ree from parking/picnic area on the N 55 Road between Ballykeeran and Glasson. (Regional Significance)

This is a panoramic view of Lough Ree and the surrounding landscape from the car parking areas on the N55 Road between Ballykeeran and Glasson.

Distance to the View: 2200 meters

Visual impact: The site of the Proposed Development is not visible from this protected view, as is from a different direction of this view. The point of the viewer is on the northeast on the site and oriented to northwest.

Protected view 2

Views of Lough Ree from Coosan waterfront from pier, slipway and forest walk trail. (Local Significance)

The focus of this view is Lough Ree to the north. Hare Island is an important feature of this view.

Distance to the View: 3000 meters

Visual impact: The site of the Proposed Development is not visible from this protected view, as is from a different direction of this view. The point of the viewer is on the northwest on the site and oriented to north.

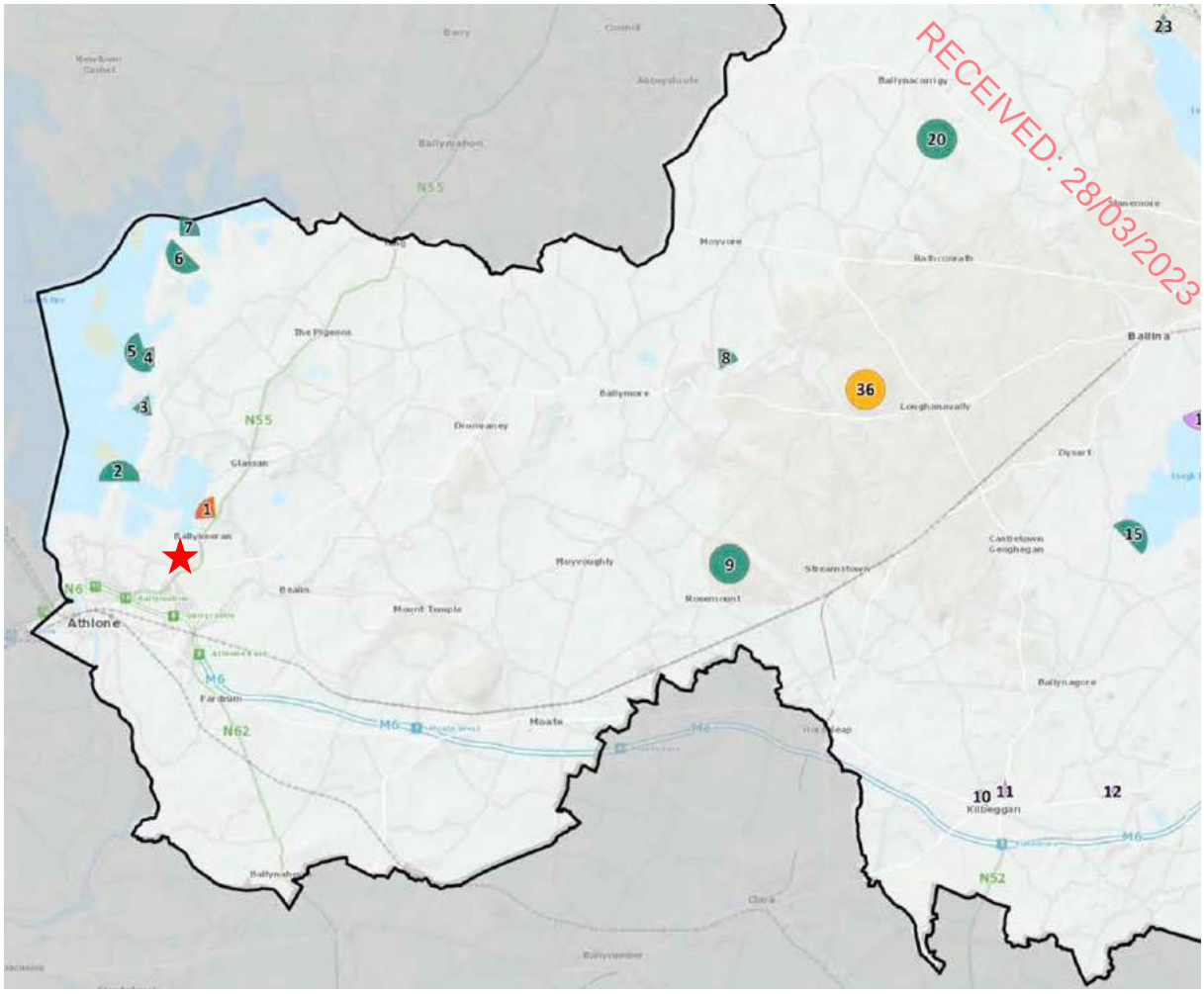


Figure 10-15: Extract from the Protected Views Map defined in the Westmeath County Development Plan. Site marked with a star

B. Scenic Routes

There is 1 Scenic Route defined by the Westmeath County Development Plan that passes through closer to the site of the Proposed Development, as can be seen in Figure 10-16 and 10-17.

Given the significance and sensitivity of Lough Ree together with the existing number of Protected Views around the lake, the Council has designated a scenic driving route along Lough Ree. It is Council policy to sustain the views of Lough Ree from the scenic route.

It's named "*Lough Ree Driving Route*" starting from the south on Athlone and going in the northeast direction, trough the N55 and then, further north, trough the Bullet Road. The route then divides between the L1459 and again by the N55, becoming further north a circular route to the east of Lake Ree.

There is still a considerable section of this route that has visibility for the Proposed Development site. However, the existing vegetation barriers screen most of the visibility to the Site. The section of this route that ends up having greater visibility for the Site is the one that is practically leaning against the eastern front of the site - a section of about 300 meters, between the N55 and the *Bullet Road*.

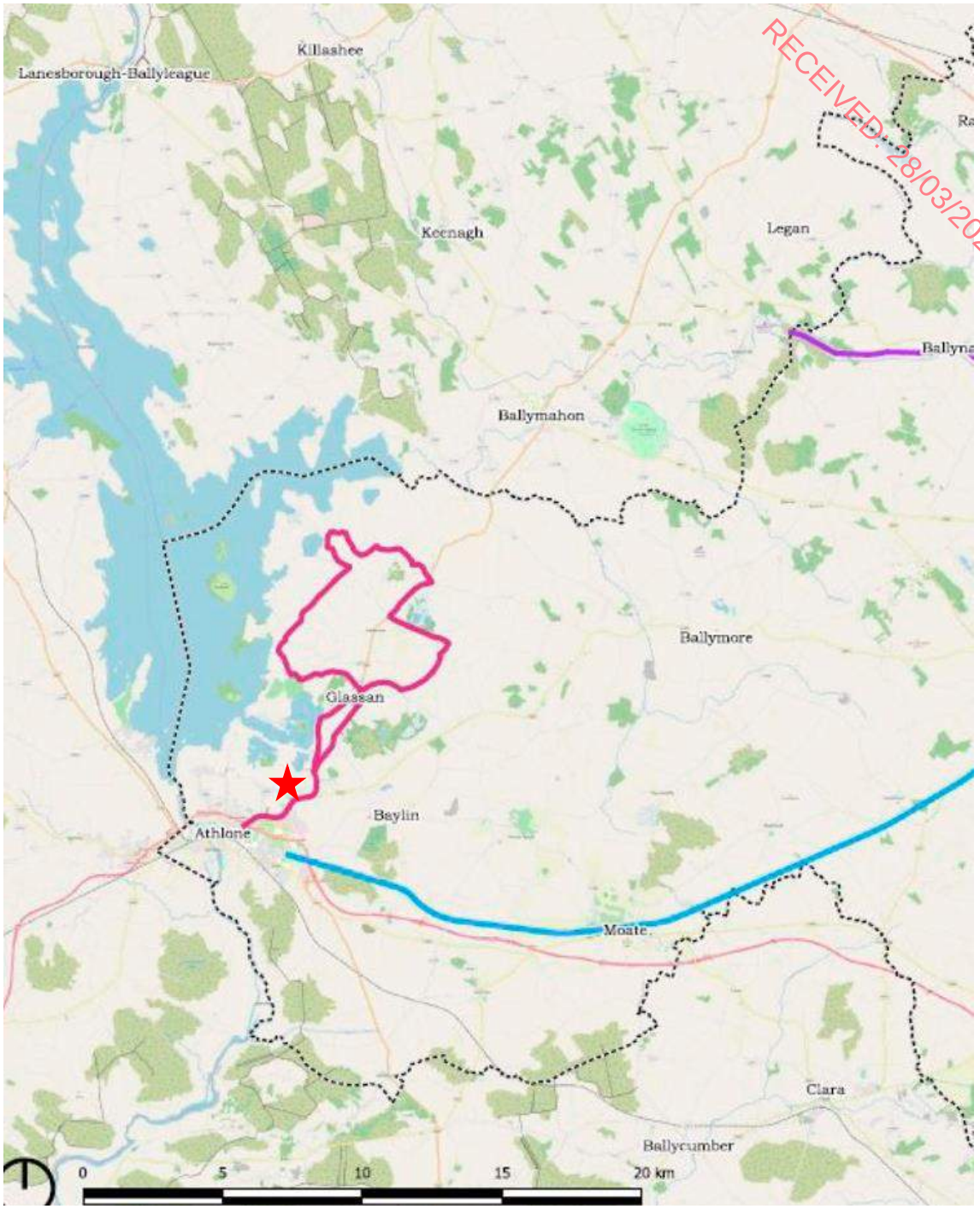


Figure 10-16: Extract from the Scenic Routes Map defined in the Westmeath County Development Plan. Site marked with a star

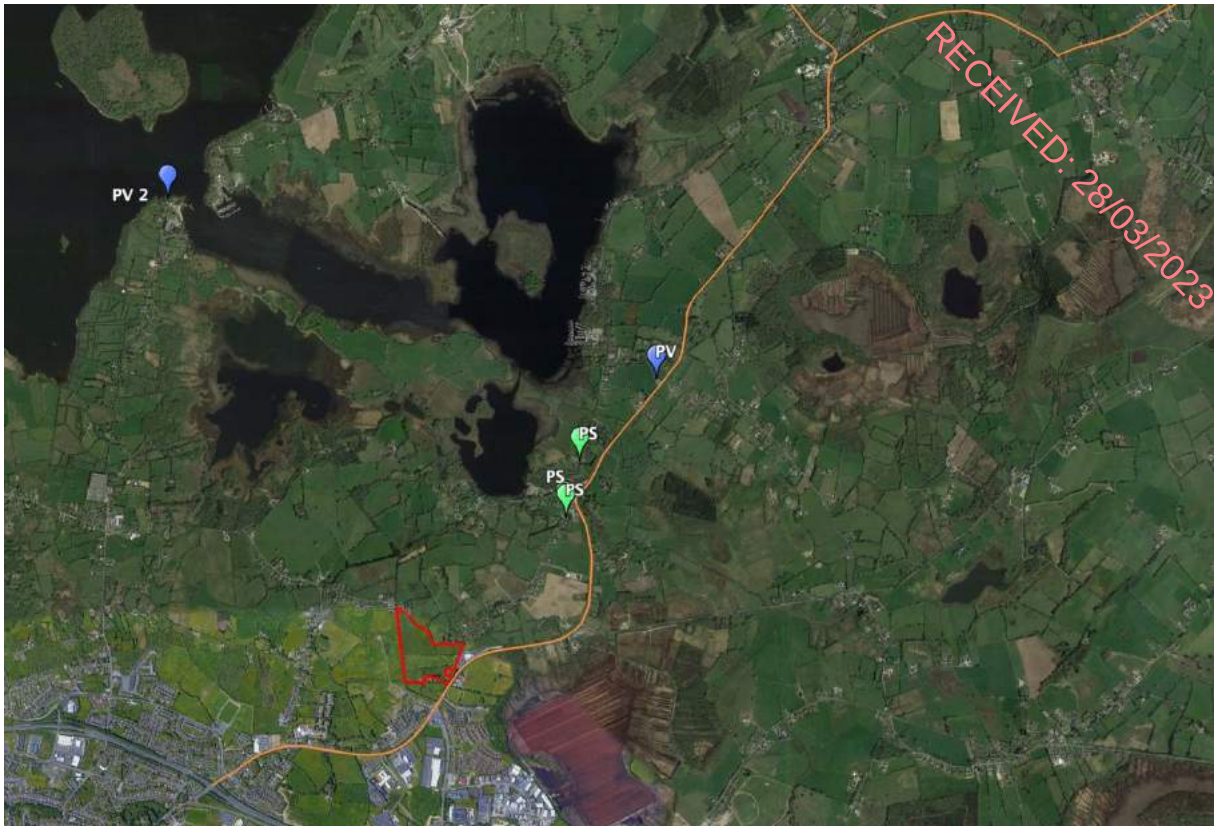


Figure 10-17: Aerial view with the Lough Ree Driving Route on orange. Site of the Proposed Development outlined in black

10.3.8 Topography and Soils

The broader landscape topography shows that the Site is enclosed in the Athlone lower's area that decreases towards North, in *Lough Ree* direction. There are some higher points to the east, being *Mount Temple* area an example, 50 meters higher than the Site level (as it can be seen in Figure 10-18).

The topographical survey of the Site indicates that the overall topography ranges from approximately 48.75m above ordnance datum (mOD) in the southwest to approximately 39.65m AOD to the central west of the Site (as it can be seen in Figure 10-19). In general, the Site is gently sloping to the west.

- The topographic high of 48.75m is associated with a mound contained within a brick wall to the south-east of the Site. The mound likely comprises demolished materials from the building present on Site up to 2007.
- There is a small hill to a maximum height of 43.46m in the northern centre of the Site.
- Map indicates the present of a possible septic tank north of the mound.
- The Shannon (Upper)_110 river (Garrynafela Stream) is located in the centre of the Site, flows from east to west and changes to a northly direction at the western boundary of the Site. The invert level of the river is 38.1mOD in as it leaves the Site.
- Two rock outcrops are mapped in the centre field of the Proposed Development during the topographic survey.

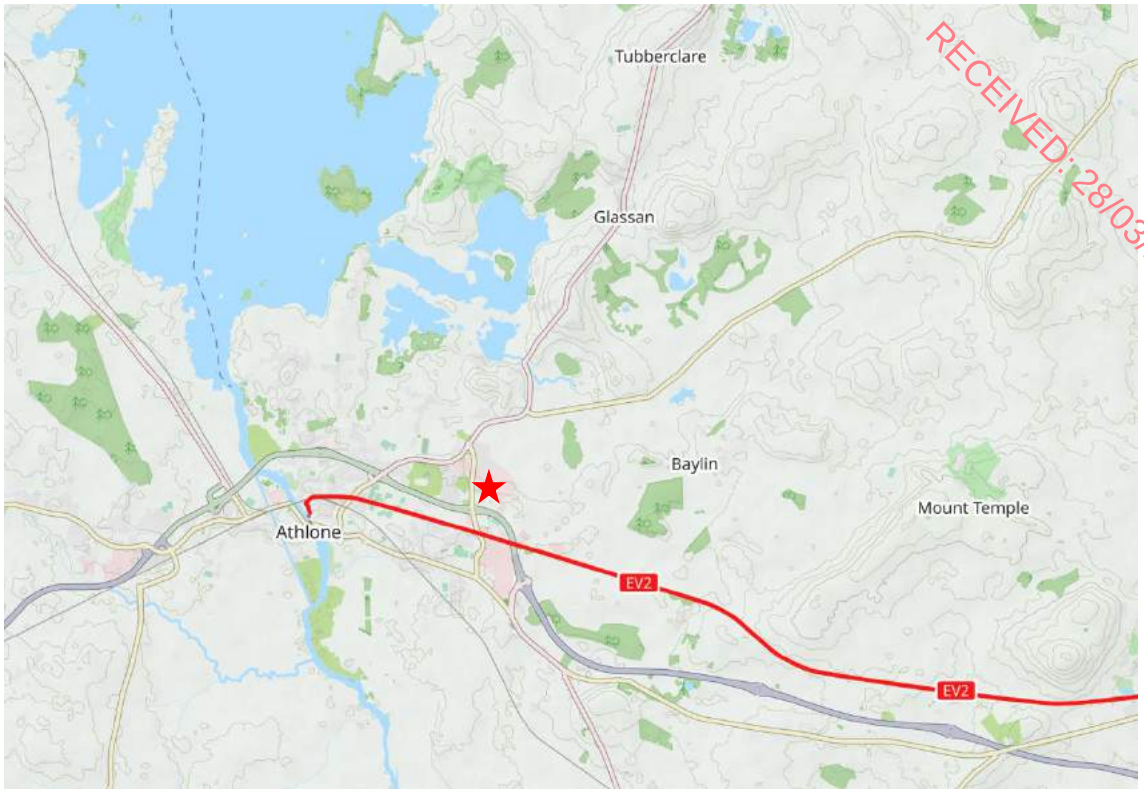


Figure 10-18: Topography on the Broader Landscape. *Source: Openstreetmap*
Proposed Development site marked with a star

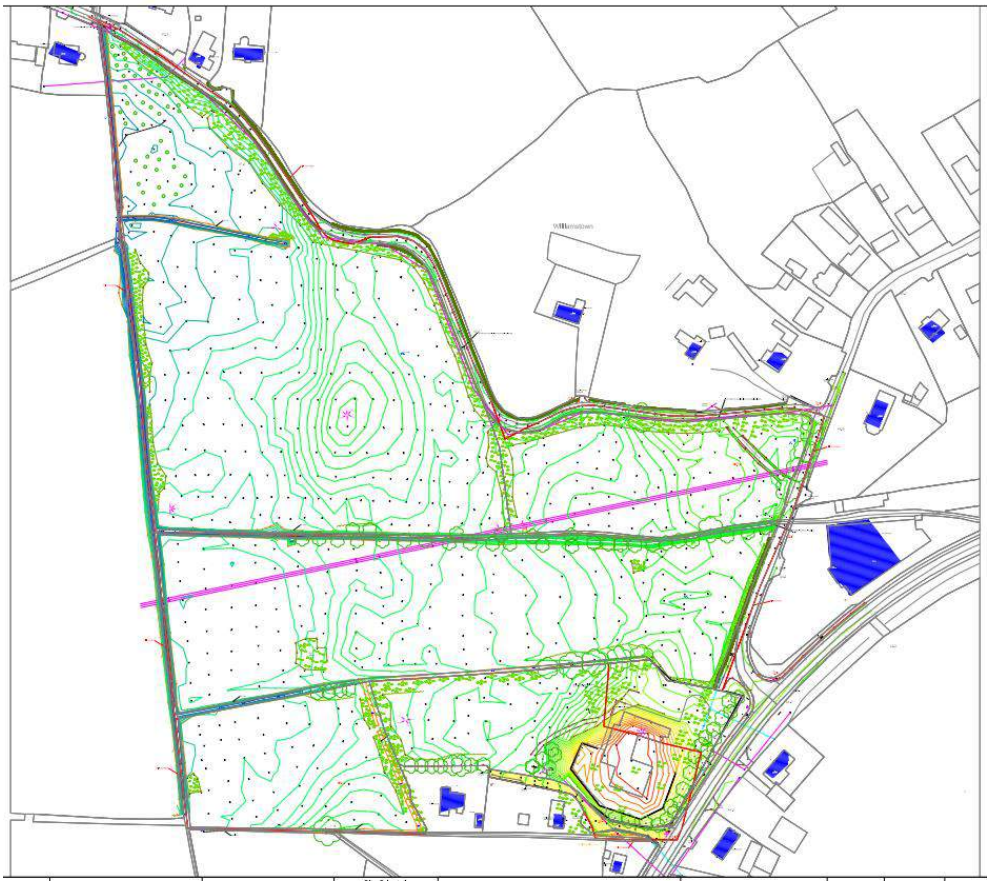


Figure 10-19: Existing Topographic Map of the Site

The soils beneath the Proposed Development Site have been mapped by Teagasc (Teagasc, 2023) as the following:

- BminSW- Shallow well drained mineral (mainly basic) with an IFS soil description of "derived from mainly calcareous parent material". Parent material is glaciofluvial sands and gravels, present to the east of the Site.
- Basin Peats with an IFS soil description of "Fen Peat" are present to the west of the Site.

10.3.9 Existing Protected Structures and Recorded Monuments

There are no Protected Structures and Recorded Monuments within the site of the Proposed Development. As can be seen in Figure 10-20 there are 4 protected structures (green circles) and 9 Recorded Monuments (blue circles) within the broader landscape of the Site.

A. Protected Structures

029-009: *Detached four-bay single-storey vernacular house in Ballykeeran, built c.1820. Pitched thatched roof with decorated ridge work, raised rendered verges to either end (north and south) and two central rendered chimneystacks. A highly appealing example of a thatched vernacular house, which retains its early form, character and fabric.*
Distance: Located about 1.0 km Southeast of the Site.

029-011: *Detached four-bay single-storey thatched cottage in Ballykeeran, Clonbrusk, built c.1820, having a projecting flat-roofed entrance porch to the main elevation (east). Modern extension to the south. Pitched thatched roof with decorated ridge work and a rendered chimneystack. An appealing example of a thatched vernacular house, which retains its early form and character despite some alterations to the openings.*
Distance: Located about 1.0 km Southeast of the Site.

022-013: *Our Lady Queen of Peace. Freestanding Roman Catholic church on rectilinear plan, built in 1973. Hipped/pyramidal slate roof having an roof lantern, offset towards the centre, rising to a spire on rectilinear plan. Cross finial over. An interesting and bold example of a post- Second Vatican Council (1963-5) Roman Catholic church. It retains its original form and character. The unusual spire/lantern is an interesting feature of some design merit and is a local landmark.*
Distance: Located about 1.7 km Southeast of the Site.

022-018: Detached three-bay single-storey former gate lodge with attic level in Ballaghkeeran Little*, built c.1870, originally serving Rossana House to the northeast (demolished). Modern lean-to extension to the rear (west). Now in use as a private house. This appealing and unusual building, which was probably originally built as a gate lodge serving Rossana House (demolished c.1990).*
Distance: Located about 1.4 km Southeast of the Site.

The Proposed Development is not visible from any of these structures, given the existing vegetation and physical barriers.

A. Recorded Monuments

WM029-001 - Castle - tower house
WM029-002 - Standing stone – pair
WM022-039 - Castle – unclassified
WM029-041 - Barrow - mound barrow
WM029-003 – Earthwork
WM029-004 - Rabbit warren
WM022-041004 - Burial mound
WM022-041003 - Pier/Jetty
WM022-041002 - House - indeterminate date

The Proposed Development is not visible from any of these sites, given the existing vegetation and physical barriers.

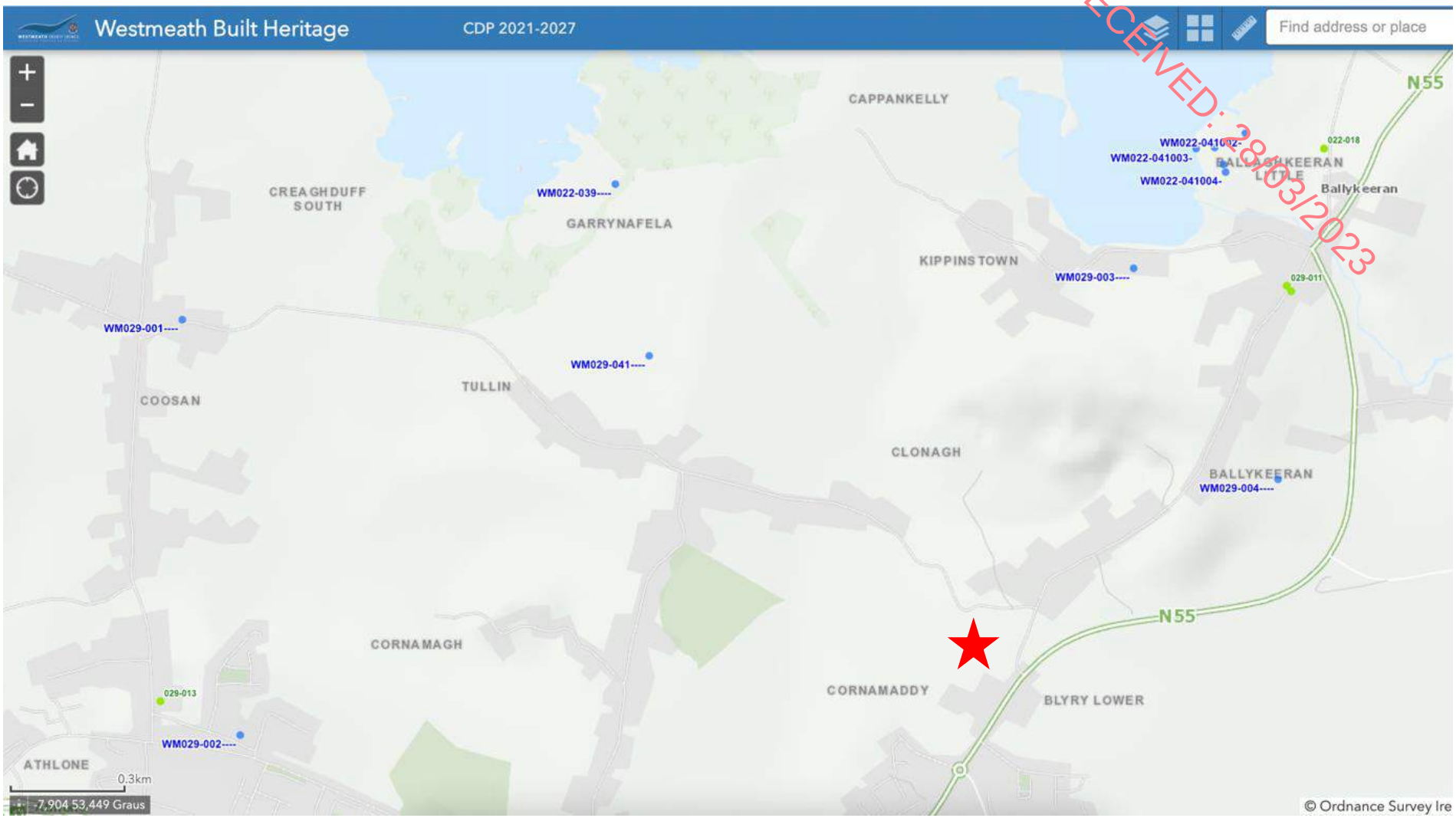


Figure 10-20: Protected Sites and Structures in the broader landscape.
Site of the Proposed marked with a red star

10.4 Characteristics of the Proposed Development

10.4.1 Description of the Proposed Development

See Chapter 2 for the description of the construction phase and operational phase of the Proposed Development.

The Master Plan and Sections of the Proposed Development, prepared by Arnold Leahy Architects can be seen in Figures 10-21, 10-22 and 1-23.

10.4.2 Landscape Project

Park Hood Chartered Landscape Architects submitted a landscape design strategy and comprehensive and detailed proposals for consideration by the Planning Authority regarding the Proposed Development. It is stated in this project:

The landscape design aims to create a sense of connectivity between spaces and promotes a sense of place and well-being within the mixed-use residential development.

A coherent pedestrian footpath network ensures residents and guests can navigate around the site easily. This aims to encourage residents to interact and use the public open space created within the landscape design.

The main public open space incorporates play spaces to ensure the landscape is interactive for children all ages. Communal open space is provided at for apartment blocks and duplex units and includes areas of hard landscape, tree planting, ornamental planting including seating / passive amenity areas.

Tree and hedge planting helps create areas of seclusion and privacy for the residents. The planting scheme uses a mix of native and ornamental tree and shrub species to create a seasonal landscape that is functional, whilst also being sympathetic to the surrounding environment.

The Landscape Proposals look at finding a balance between creating a safe space, sense of place and responding to the existing conditions. Most of the existing vegetation will be retained particularly to the east of the stream without compromising the usability of the space. The east of the stream will see post and rail fences proposed for safety reasons and the west of the water course will be regraded with 1 in 3 slopes and gabions where needed to encourage interaction and provide that sense of place.

The Public Open Space areas will provide opportunities for seating and soft areas of landscaping. The total public open space is 17.68% of the footprint of the Proposed Development.

The landscape plan proposes a mix of tree species to create a natural and welcoming environment for people. The proposed tree planting schedule will add a layer of colour and seasonal interest within the site, but also to consider climate mitigation by choosing hardy, locally sourced plants.

Specific planting mixes are also considered for lighting conditions (sun and shade-loving species) and emphasis on pollinators (with reference to the All-Ireland Pollinator Plan 2021-2025) to enhance the biodiversity at the site.

Trees are used to provide a natural buffer between spaces and punctuate pedestrian routes to reinforce the paths. They also create shelter and focal points within the landscape. The use of semi-mature tree planting ensures the site will provide an instant positive contribution to the surrounding environment. Native planting will be used to reinforce the existing characteristics of the environment.

In order to promote and enhance the biodiversity in the development, various strategies will be considered such as:

- Establishing a wildlife corridor

- To support and enhance the habitat for a diversity of wild creatures (birds, bats, hedgehogs, toads etc.)

- Hedges: Provide flowers and fruits for wildlife, nesting opportunities for birds and cover for hedgehogs.

- Wood Piles: Can be used to create habitats for amphibians, invertebrates and bryophytes micro-habitats by leaving piles of dead wood or recumbent dead logs.

- Pollinators: A variety of wildflowers and shrubs are proposed in the planting that providing shelter as well as nectar and pollen to feed butterflies and bees. The plant selection is based on recommendations within the All-Ireland Pollinator Plan (2015-2020).

The Northern end of the Public Open Space will be utilised for a wildlife corridor that will enhance biodiversity and habitat creation. It will primarily be used for walks with seating areas provided at regular interval and connections have been made to the *Glenveagh Development*.

The Southern end of the Public Open space will be used more for amenity and recreation with the provision of a play park and a large open space for a variety of uses such as a kick about area.

Low level bollard lighting will be provided through the perimeter walkway in line with ecologists recommendations. The lighting design will also mimic the *Glenveagh Development* to provide continuity.

Figure 10-21: Site Layout Plan. Source: Arnold Leahy Architects

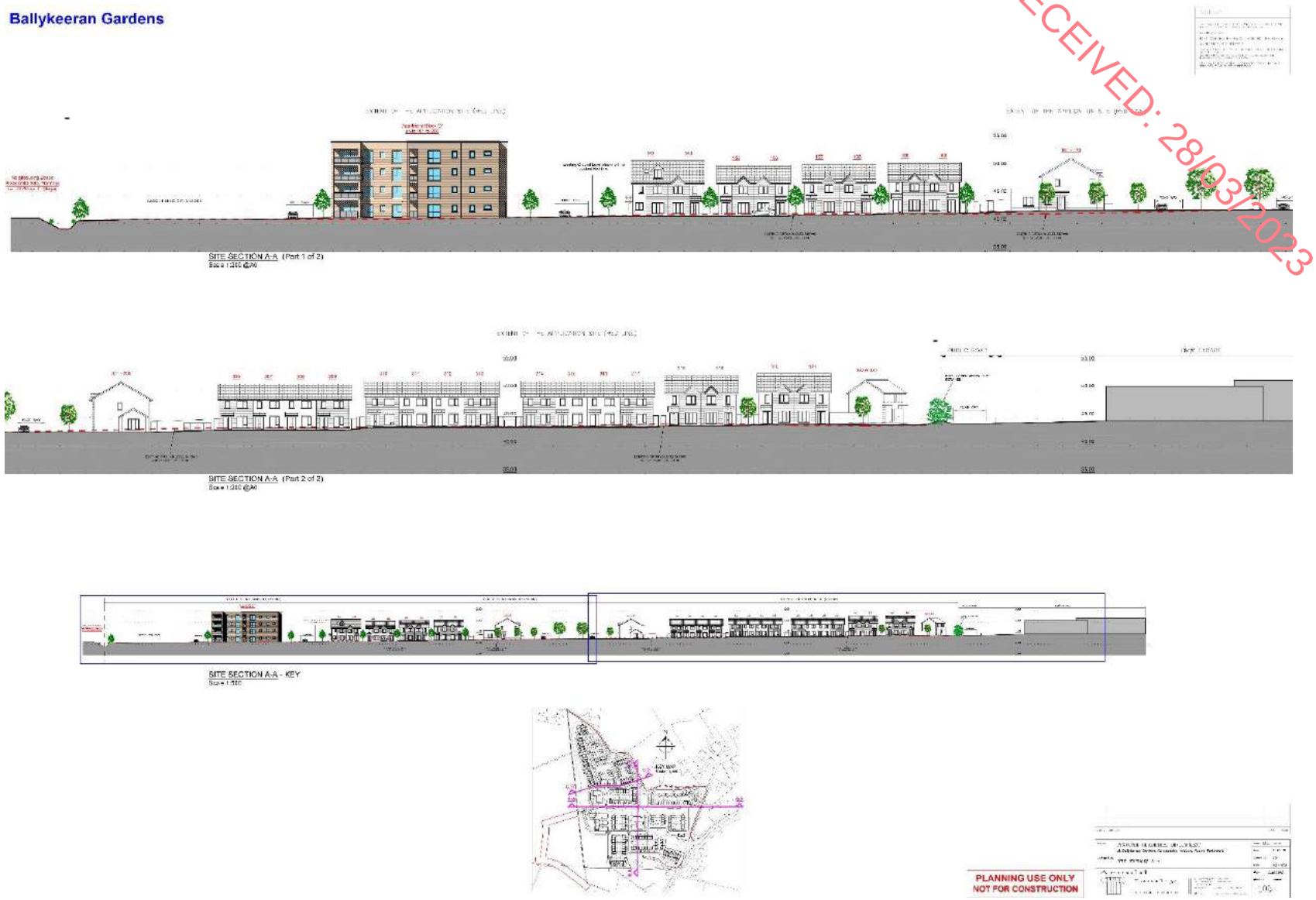


Figure 10-22: Site Sections. Source: Arnold Leahy Architects

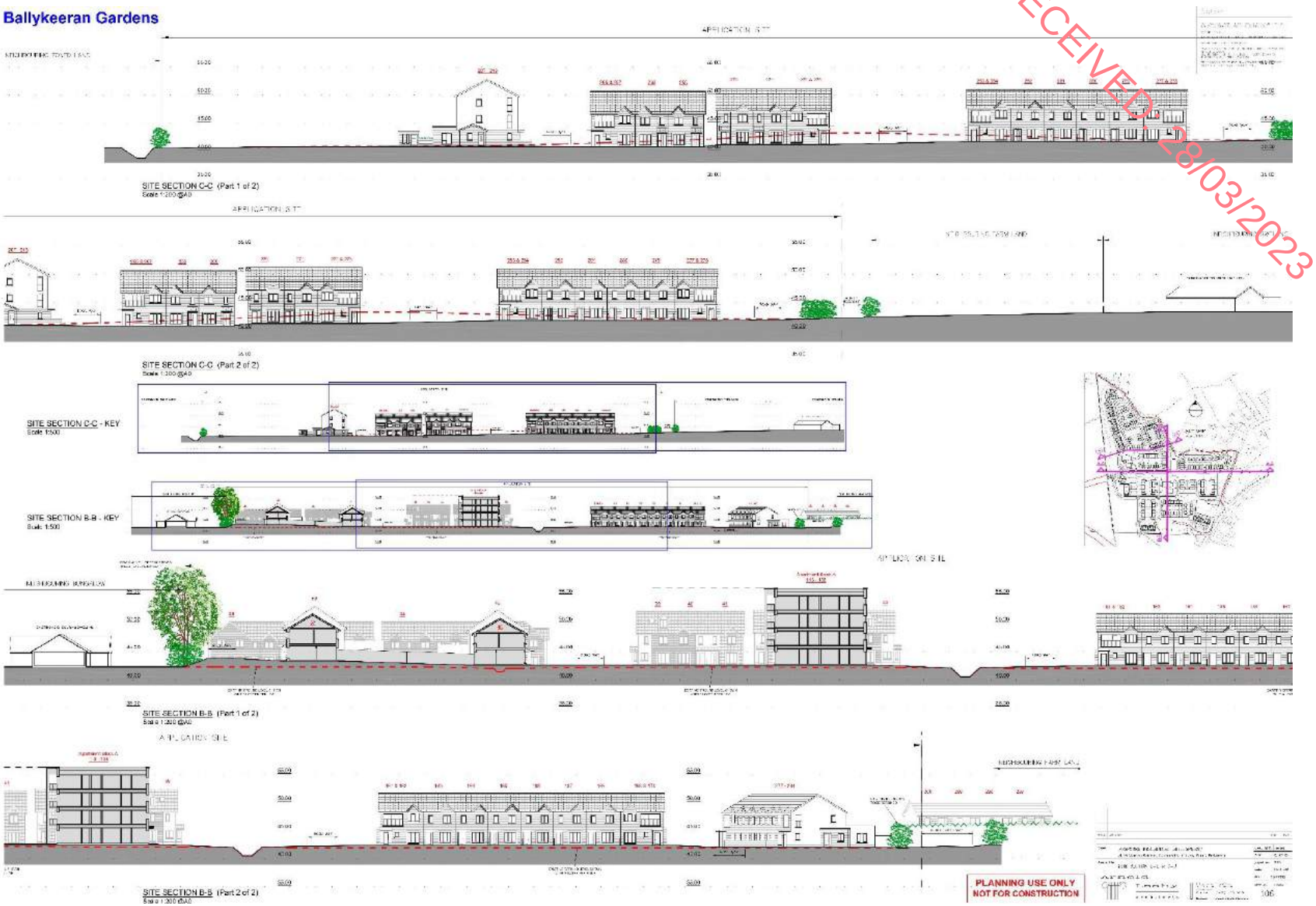


Figure 10-23: Site Sections. Source: Arnold Leahy Architects

Figure 10-10-24: Landscape Architecture Masterplan. Source: Park Hood Chartered Landscape Architects

10.5 Potential Impact of the Proposed Development

10.5.1 Potential Landscape Impact

Landscape effects – Degree of change to physical characteristics or elements of the landscape, which together form the character of that landscape, e.g. landform, vegetation, boundaries, buildings etc.

10.5.1.1 Construction Phase

The Construction Phase is divided in 3 phases and is expected to last 10 years. During the Construction Phase, the site landscape will undergo a change. Expected landscape impacts include:

- Numerous large, brightly coloured earth moving equipment, construction machinery, cranes operating on the site and construction site offices/facilities, security lighting and fencing;
- Change in colour and form of topography due to the excavation, removal and storage of soils;
- Removal of trees and shrubs and part of the West hedgerow;
- Creation of areas of hard surfaces (car parks, paths, roads);
- Construction of proposed new buildings;
- Planting of proposed green structure (trees, shrubs, herbaceous, lawns);

According to the *Phasing Plan* (see Chapter 2) the 1st phase corresponds to the South part of the Proposed development and new link road on the west. With the development of this phase the proposed green structure corresponding to this phase will also be implemented which allows to mitigate the landscape and visual impacts of the following construction phases.

A Tree Arboricultural Report and Survey was submitted by *Charles McCorkell Arboricultural Consultancy* in June 2002. Crossing the information on this report with the Proposed Development Project, the following conclusions regarding the existing vegetation are identified in Table 10-13.

Table 10-13 Table Summary for all tree quantities

TOTAL NOS OF TREES SURVEYED	QTY
Total number of trees surveyed within the site including individual trees, groups and hedges	111
Tree Category	**QTY**
B grade	24
C grade	64
U grade	23

FELLED - Subject to below condition	QTY
Trees noted as being in "Poor" condition and recommended for felling as per Tree Survey report 2022	22
Trees and woodland groups noted as being in fair or good condition in Tree Survey 2021 to be felled to facilitate development.	16
TOTAL	38

RETAINED/PROPOSED - Subject to below conditions	QTY
Trees and woodland groups to be retained	73
Trees proposed site wide within open spaces, street-scape and commercial areas	347
TOTAL	420

The majority of the existing trees are kept, felling only 38 of a total of 111 existing trees, the majority being evaluated with “poor” conditions. Considering that 420 new trees are planted, there is a clear ecological/landscape benefit.

The predicted landscape impacts will reduce rapidly with distance from the site boundaries. Intervening hedgerows, open park spaces, and existing buildings will further reduce the impacts to minor to negligible, negative and short term for the Construction Phase. It is concluded that the Proposed Development will, therefore, have a minor, negative and short to medium-term impact on the landscape character of the site during the Construction Phase.

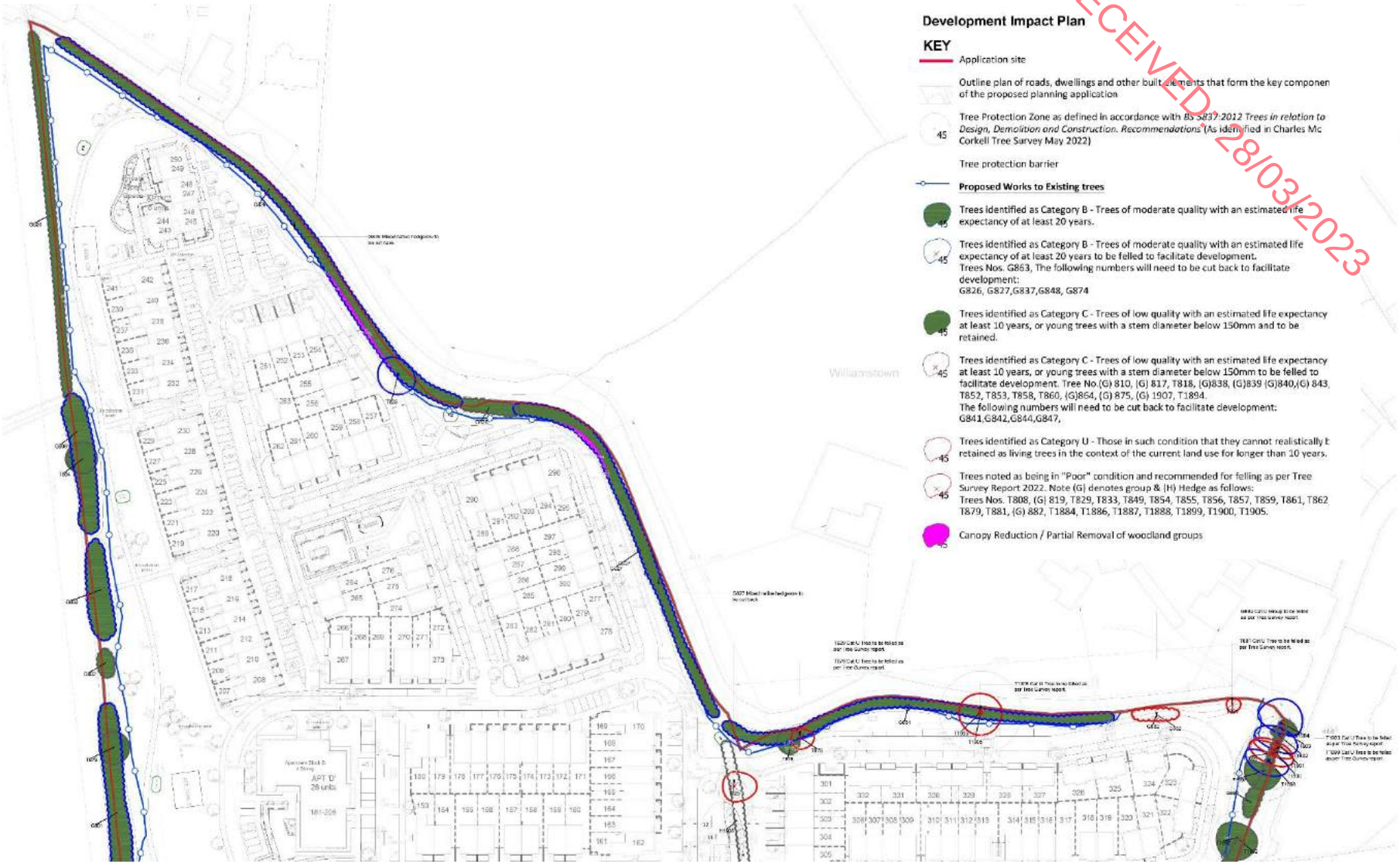


Figure 10-25: *Development Impact Plan, 1/2. Source: Park Hood Chartered Landscape Architects*

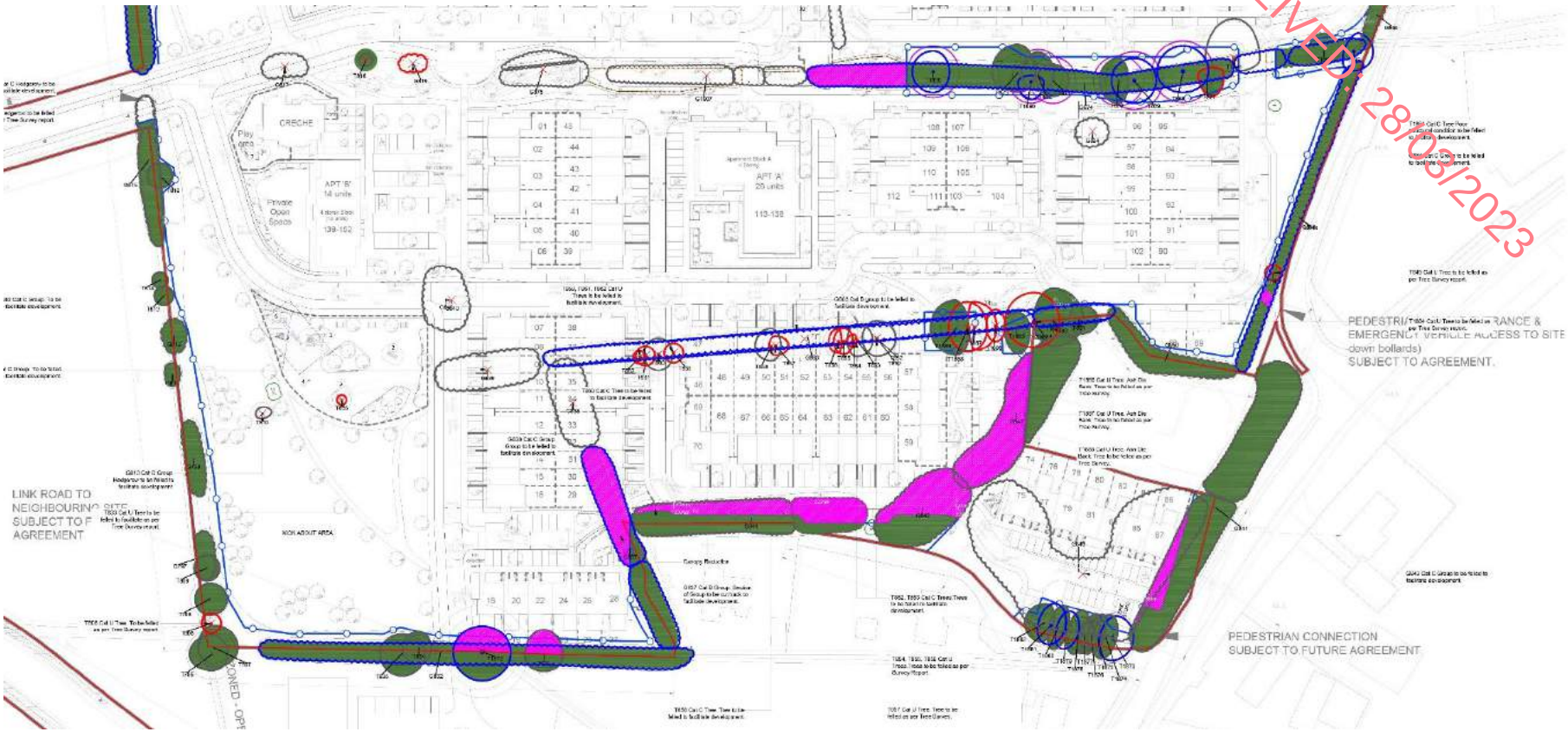


Figure 10-26: *Development Impact Plan 2/2. Source: Park Hood Chartered Landscape Architect*

10.5.1.2 Operational Phase

It is not expected that the Operational phase of the Proposed Development will cause any negative impact.

It is considered, in the context of the Development Plan zoning, the Proposed Development is a continuation of existing trends in the local area.

The potential landscape impacts will be neutral and long-term as a result of the Proposed Development.

10.5.2 Visual Impacts

10.5.2.1 Visual Receptor Sensitivity

In terms of visual sensitivity, the receptors will be categorised as those being:

- Typically, non-designated viewpoints of modest visual amenity representing local residential receptors. These are deemed to be of **Medium-low** visual sensitivity.
- Typically, single designation viewpoints representing tourists / visitors or local residents involved in recreational or amenity-based activity where an appreciation of the visual setting is integral to the experience and pleasant views are afforded These are deemed to be of **Medium** visual sensitivity.
- Typically, an amenity and/or heritage feature viewpoint with aesthetic and/or extensive views, but without any scenic designation. This is deemed to be of **Medium** visual sensitivity.
- Typically, a scenic designation viewpoint, in combination with a separate heritage/amenity designation These are deemed to be of **High-Medium** visual sensitivity.

10.5.2.2 Magnitude of Visual Impact

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the Proposed Development. Photomontages are a ‘photo-real’ depiction of the scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

1. Existing View
2. Verified View

The baseline photography was captured on 26 September 2022 and thus, deciduous trees are still with leaf. In these instances seasonal factors are not considered to contribute to material differences in the visual impacts assessed below and any likely variations will be described.

10.5.2.3 Viewpoint Locations

A total of 9 viewpoint locations were selected for use in the photomontage assessment of visual effects. The choice of viewpoint locations is influenced by both the views available and the type of viewer. Choice of viewpoint locations aimed to incorporate prominent visual receptors where there is likely to be either residential receptors or regular motor traffic. The choice of viewpoint locations should cover locations where the site will be completely visible as well as partially visible and the choice of viewpoint locations in this instance did so.

Figure 10-27: Proposed viewpoints. Viewing altitude: 4.00 km. Source: Google Earth

10.5.2.4 Viewpoint Assessment

Whether a visual effect is deemed to be positive, negative or neutral involves a degree of subjectivity. What appears to be a positive effect to one viewer could be deemed to be a negative effect by another viewer. All predicted visual effects of the viewpoints below are long term and direct effects.

The images that follow intend to represent, as accurately as possible, the physical and visual characteristics of the Proposed Development from a variety of distances and directions around the site. Priority was given to views from the public domain, such as main roads and to views from potentially sensitive locations such as residential areas. The location of all views is shown on Figure 10-28. For each of the visuals, an existing and a proposed view is presented and where the Proposed Development is not visible in the view the elements of the development will be shown as a red outline.

- ***Viewpoint 01***

Figure 10-28 Viewpoint 01, Unnamed road (Garrynafela), Existing View

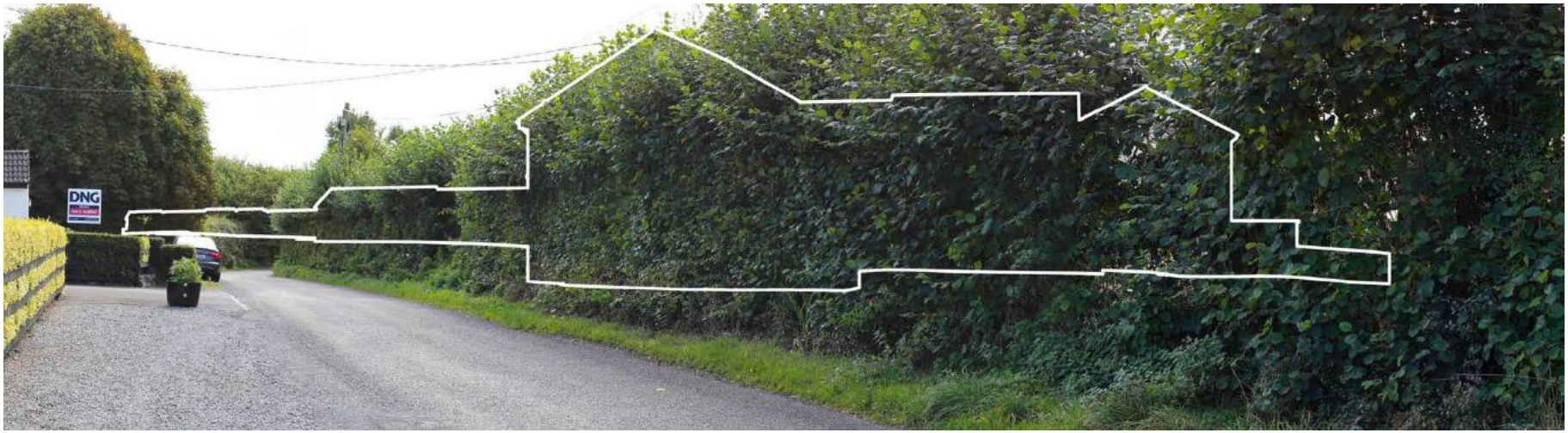


Figure 10-29 Viewpoint 01, Unnamed road (Garrynafela), Verified View

Viewpoint 1 (Figures 10-29 and 10-30)	
Location	Unnamed road (Garrynafela)
Coordinates	321506E 220407N
Viewing distance to Site	314 meters
Direction of View	Southeast
Existing View	View from an unnamed road, in the *Garrynafela* area, next to a settlement to the north of the Site. This viewpoint is right next to a dwelling. There is practically no visibility to the south or east, due to the mature hedgerow that exists right next to the road.
Value of the View	Medium
Visual Susceptibility	High
Visual Sensitivity	High
Magnitude of Visual Changes	None
Duration of Effects	Temporary
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Imperceptible
Conclusion or Visual Impact of Proposed Development	The visual impact of the Proposed Development is imperceptible, due to the screening of the existing vegetation in the foreground. A white silhouette of the Proposed Development is represented in the image.

- ***Viewpoint 02***

Figure 10-30 Viewpoint 2, Unnamed road (Williamstown), Existing View

Figure 10-31 Viewpoint 2, Unnamed road (Williamstown), Verified View

Viewpoint 2 (Figures 10-31 and 10-32)	
Location	Unnamed road (Williamstown)
Coordinates	321679E 220236N
Viewing distance to Site	525 meters
Direction of View	South
Existing View	View from an unnamed road, in the *Williamstown* area, about 185 meters from Viewpoint 1, also north of the Site. View with a wide visual range, given the break in the hedgerow on the south of the road (referred to in Viewpoint 1) - there is only a shrub-hedge, with less than 1.5 meters height, separating the road from the Site. The agricultural field occupies a large part of the visual plan in the foreground, being possible to see the most central hedgerows of the Site and the vegetation on the banks of the *Garrynafela* stream. The existing electric poles and cables end up having a negative visual impact on this landscape.
Value of the View	Medium
Visual Susceptibility	Medium
Visual Sensitivity	Medium-Low
Magnitude of Visual Changes	High
Duration of Effects	Medium-term
Quality of Effects	Neutral to Negative
Significance of Landscape and Visual Effects	Moderate
Conclusion or Visual Impact of Proposed Development	The Proposed Development turns out to have a moderate impact considering the decrease in visual scope at this point. The visual scope ends up being dominated by the Proposed Development. Considering that the Proposed Development follows the prevailing height in the residential area (typically suburban), with mostly single and two storey buildings from this view, the impact turns out not to be more significant. The growth of the hedgerow in the foreground and the proposed vegetation foreseen in the project will mitigate the mentioned impacts in the medium term. However, this mitigation would be stronger if there was a reinforcement of the plantations of large trees/shrubs in the green zone behind the existing shrub hedge.

- ***Viewpoint 03***

Figure 10-32 Viewpoint 3, Unnamed Road/Bullet Road Junction, Existing View

Figure 10-33 Viewpoint 3, Unnamed Road/Bullet Road Junction, Verified View

Viewpoint 3 (Figures 10-33 and 10-34)	
Location	Unnamed Road/Bullet Road Junction
Coordinates	321504E 220716N
Viewing distance to site boundary	341 meters
Direction of View	Southwest
Existing View	View from a junction between an unnamed road and Bullet Road, near the entrance to two dwellings, close to the eastern limit of the Site. Given the opening that exists in the hedgerow in this area, it is possible to have some visibility to the West, being visible an agricultural field in the foreground and one of the central hedgerows (with east/west orientation) that exists within the Site. 3 electrical poles and the respective cables are also visible.
Value of the View	Medium
Visual Susceptibility	High
Visual Sensitivity	High
Magnitude of Visual Changes	Medium
Duration of Effects	Short to Medium-term
Quality of Effects	Neutral to Negative
Significance of Landscape and Visual Effects	Minor to Moderate
Conclusion or Visual Impact of Proposed Development	The Proposed Development has a minor visual impact as the vegetation barriers in this zone end up screening most of the visual impacts. This opening in the hedgerow turns out to be much lower than that identified in Viewpoint 2. Again, the Proposed Development follows the prevailing height in the typically suburban residential area in the broader landscape. This view only shows two storey buildings. The difference in the proposed materials also helps to mitigate the visual impact of the new buildings. The growth of the hedgerow in the foreground will mitigate the visual impacts in the short-term.

- ***Viewpoint 04***

Figure 10-34 Viewpoint 4, Blyry Court, Existing View

Figure 10-35 Viewpoint 4, Blyry Court, Verified View

Viewpoint 4 (Figures 10-35 and 10-36)	
Location	Blyry Court (west of Colm Quinn BMW Athlone)
Coordinates	321344E 221084N
Viewing distance to Site	380 meters
Direction of View	West
Existing View	Viewpoint on the *Blyry Ct*., about 125 meters south of Viewpoint 3, next to the *Colm Quinn BMW Athlone* parking lot. View with a considerable visual range, given that there is only a bush-hedge between the road and the eastern limit of the Site. Two agricultural fields are visible, one in the foreground and another in the background (towards the east) already outside the Site. A mature hedgerow borders the northern part of the agricultural field in the foreground, with more hedgerows visible in the background.
Value of the View	Medium
Visual Susceptibility	Medium
Visual Sensitivity	Medium-Low
Magnitude of Visual Changes	High
Duration of Effects	Medium-term
Quality of Effects	Neutral to Negative
Significance of Landscape and Visual Effects	Moderate
Conclusion or Visual Impact of Proposed Development	Considering the great visual scope identified in the existing situation, the Proposed Development ends up having a moderate impact, as it becomes the dominant element of this Landscape. The fact that only 2-storey buildings are proposed in this area of the Proposed Development, as well as the proposal to use different but neutral materials, contributes to the visual impact not being so significant. The bush-hedge in the foreground had recently been pruned at the time of the photographic register. In the short term, with the growth in height of this hedge, it will partially mitigate the identified visual impacts. The proposed vegetation in the Proposed Development green spaces will also help to mitigate these visual impacts.

- ***Viewpoint 05***

Figure 10-36 Viewpoint 5, N55 Road, Existing View

Figure 10-37 Viewpoint 5, N55 Road, Verified View

Viewpoint 5 (Figures 10-37 and 10-38)	
Location	N55 Road (east of Colm Quinn BMW Athlone)
Coordinates	321139E 221660N
Viewing distance to site boundary	170 meters
Direction of View	West
Existing View	View dominated by the parking lot of the *Colm Quinn BMW Athlone*, which being in the foreground ends up having almost the entire visual range. The landscape is quite heterogeneous, with a lot of disruptive elements such as cars, street furniture, signage, and lighting posts. In the background there is visibility to part of the central hedgerows of the Site, which feature several mature trees.
Value of the View	Low
Visual Susceptibility	Low
Visual Sensitivity	Medium-Low
Magnitude of Visual Changes	Low
Duration of Effects	Medium-term
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Minor
Conclusion or Visual Impact of Proposed Development	The Proposed Development ends up having a neutral minor visual impact, as the *Colm Quinn BMW Athlone* continues to be the dominant element in this Landscape. There is some visibility for the Proposed Development, but the proposed buildings end up being well framed with the existing vegetation that is maintained. In the short-term, the proposed vegetation will further reduce the visibility for the Proposed Development.

- ***Viewpoint 06***

Figure 10-38 Viewpoint 6, N55 Road, Existing View

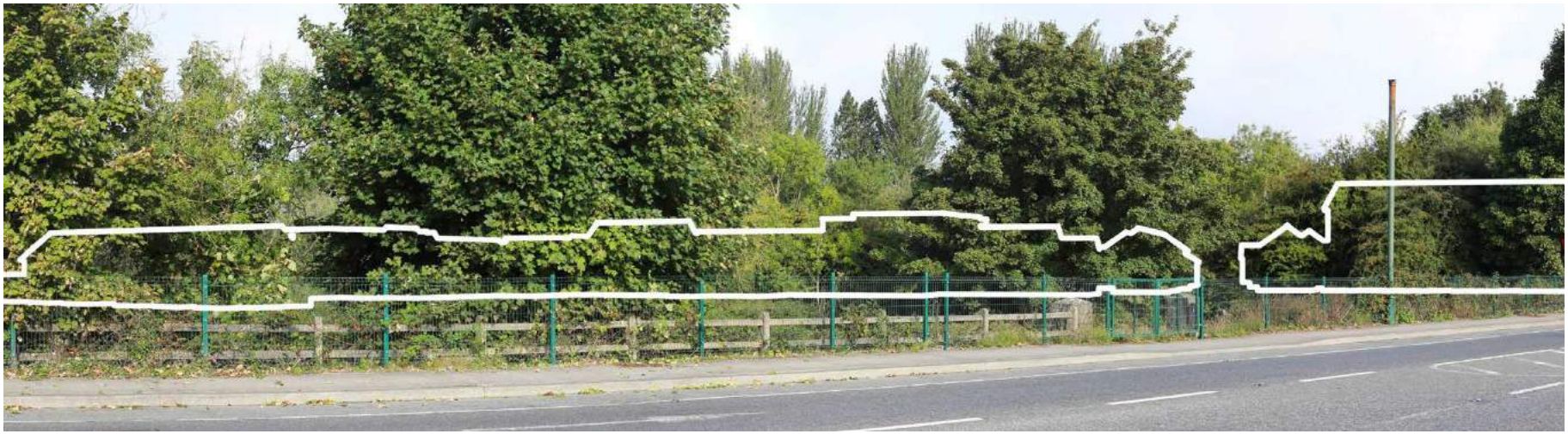


Figure 10-39 Viewpoint 6, N55 Road, Verified View

Viewpoint 6 (Figures 10-39 and 10-40)	
Location	N55 Road near The Orchard Junction
Coordinates	320564E 226631N
Viewing distance to Site	140 meters
Direction of View	North
Existing View	Viewpoint on N55 Road, next to the access to *The Orchard* residential area. There is little visibility to the West, on the other side of the road, given the existing arboreal hedge, with mature trees in the southeast limit of the Site. A double metallic and wooden fence that separates the road from the Site is also visible once is in front of the hedge.
Value of the View	Medium
Visual Susceptibility	Medium
Visual Sensitivity	Medium
Magnitude of Visual Changes	None
Duration of Effects	Temporary
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Imperceptible
Conclusion or Visual Impact of Proposed Development	The visual impact of the Proposed Development is imperceptible, due to the screening of the existing vegetation in the foreground. A white silhouette of the Proposed Development is represented in the image.

- ***Viewpoint 07***

Figure 10-40 Viewpoint 7, L8048, Existing View

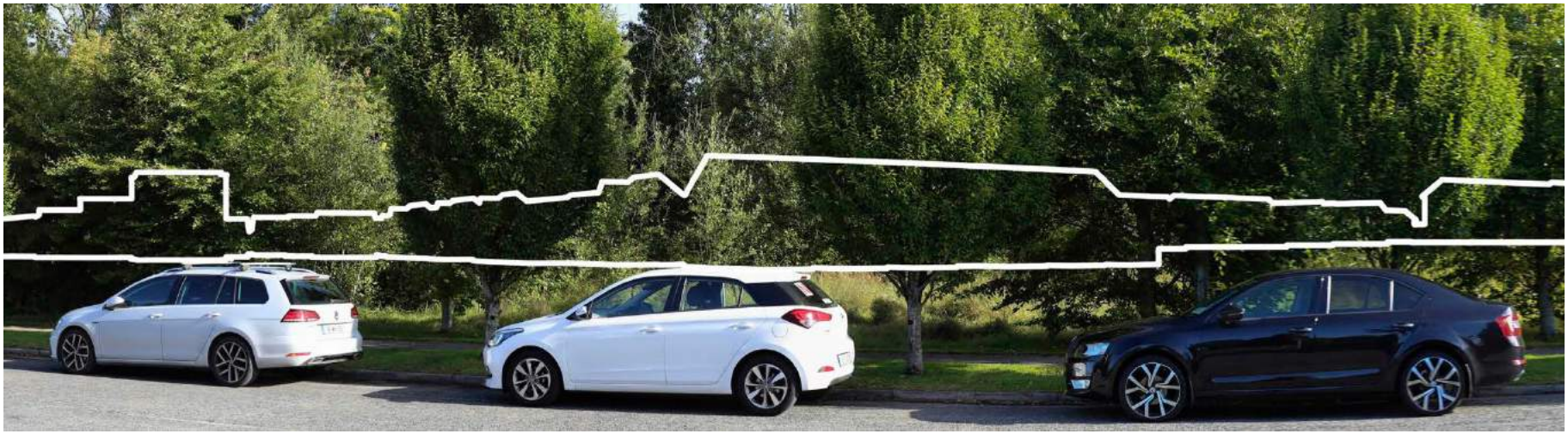


Figure 10-41 Viewpoint 7, L8048, Verified View

Viewpoint 7 (Figures 10-14 and 10-15)	
Location	L8048 (Cornamaddy)
Coordinates	322684E 220903N
Viewing distance to Site	200 meters
Direction of View	North
Existing View	View from the L8048, next to the access to the *Drumanconn* residential area. There is little visibility to the North, towards the Site, given the existence of an alignment of medium-sized trees planted next to the road and the hedgerow that exists in the background.
Value of the View	Medium
Visual Susceptibility	High
Visual Sensitivity	Medium
Magnitude of Visual Changes	None
Duration of Effects	Temporary
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Imperceptible
Conclusion or Visual Impact of Proposed Development	The visual impact of the Proposed Development is imperceptible, due to the screening of the existing vegetation in the foreground. A white silhouette of the Proposed Development is represented in the image.

- ***Viewpoint 08***

Figure 10-42 Viewpoint 8, Cornamagh road, Existing View

Figure 10-43 Viewpoint 8, Cornamagh road, Verified View

Viewpoint 8 (Figures 10-43 and 10-44)	
Location	Cornamagh road, close to the *Cornamagh Cemetery* entrance
Coordinates	319248E 20605N
Viewing distance to site boundary	1.40 kilometers
Direction of View	East
Existing View	View from *Cornamagh* road, near to the *Cornamagh Cemetery* access and next to a dwelling´s settlement. The landscape turns out to be somewhat heterogeneous given the great diversity of tree species present with different sizes and silhouettes. Even though this viewpoint is at a considerable distance from the Site, there is still some visibility to the hedgerow that makes up the West limit, in the background. The metal gate in the foreground turns out to be the most disruptive element in this landscape.
Value of the View	Medium
Visual Susceptibility	High
Visual Sensitivity	High
Magnitude of Visual Changes	Low
Duration of Effects	Short-term
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Minor to Imperceptible
Conclusion or Visual Impact of Proposed Development	The Proposed Development has an almost imperceptible visual impact, which will be mitigated in the short-term, with the growth of the vegetation in the foreground.

- ***Viewpoint 09***

Figure 10-44 Viewpoint 9, Cornamagh road, Existing View

Figure 10-45 Viewpoint 9, Cornamagh road, Verified View

Viewpoint 9 (Figures 10-45 and 10-46)	
Location	Cornamagh road, near the *Custume Pitch and Putt Club Athlone*
Coordinates	319248E 20605N
Viewing distance Site	1.40 kilometers
Direction of View	East
Existing View	View from *Cornamagh Road*, near the *Custume Pitch and Putt Club Athlone* entrance. This view has a significant visual range, being dominated by the car parking and pitch in the foreground. In the background, the landscape is delimited by the tree-shrub hedge to the north and east of the field, which turns out to be quite fragmented (mainly the eastern part). On a more distant visual plan, there is still visibility for part of the existing hedgerows within the Site, and some sets of dwellings.
Value of the View	Medium
Visual Susceptibility	High
Visual Sensitivity	High
Magnitude of Visual Changes	Low
Duration of Effects	Short-term
Quality of Effects	Neutral
Significance of Landscape and Visual Effects	Minor
Conclusion or Visual Impact of Proposed Development	The Proposed Development has a minor visual impact, with only a set of new buildings being visible in full and most of the remaining buildings only partially visible. It's visually well framed with the hedgerow in the north of the Site that works as a backdrop for the Proposed Development. In the short-term the existing vegetation in the foreground as well as the proposed vegetation will partially mitigate this visual impact.

Visual Impacts Effects Conclusion

After evaluating the visual impact on these 9 points, the Table 10-14 below summarizes 3 of these criteria (Duration, Quality and Significance) of the 7 assessed in each image. This is because these are the criteria that are considered more important to the final visual impact assessment.

Table 10-14 Visual Impact Assessment Results

Duration of the Effects	Viewpoints	Total	%
Permanent	_	0	0%
Long-term to Permanent	_	0	0%
Long-term	_	0	0%
Medium to Long-term	_	0	0%
Medium-term	2, 4, 5	3	33%
Short to Medium-term	3	1	11%
Short-term	8, 9	2	22%
Temporary	1, 6, 7	3	33%
Quality of the Effects			
Beneficial	_	0	0%
Neutral to Beneficial	_	0	0%
Neutral	1, 5, 6, 7, 8, 9	6	67%
Neutral to Negative	2, 3, 4	3	33%
Negative	_	0	0%
Significance of Land-scape and Visual Effects			
Imperceptible	1, 6, 7	3	33%
Minor to Imperceptible	8	1	11%
Minor	5, 9	2	22%
Minor to Moderate	3	1	11%
Moderate	2, 4	2	22%
Moderate to Significant	_	0	0%
Significant	_	0	0%
Profound	_	0	0%

Although having a small sample it is concluded that, of the 9 selected viewpoints, 33% will have temporary visual impacts and 33% will have short-term or short to medium-term visual impacts. Regarding quality, 67% of the points are considered neutral and 33% minor to moderate or moderate visual impacts. No viewpoints are considered as having a significant, negative and long-term impact. It's concluded that the proposed green structure will mitigate, in the medium-term, the identified moderate visual impacts.

10.6 Potential Cumulative Impacts

Cumulative impacts can be described as impacts that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.

As it can be seen in Figure 10-46 there are 3 Application submitted for within the closer outskirts of the Proposed Development:

- Glenveagh Development – Planning Application no. 22253 (number 2 on Figure 10-46)

This Development ends up continuing the trend of housing developments in this area. It links the Proposed Development in the West and is connected to the proposed new road connection. The effects on the landscape turn out to be at the same level as those identified in the Proposed Development, with the maintenance of hedgerows in the periphery and the creation of several new green areas. It will unify the green spaces east of this Development and west of the Proposed Development. This Development will end up creating a visual barrier to the West of the Proposed Development and mitigate all the visual impacts identified on the West front.

- Creche – Planning Application no. (number 3 on Figure 10-46) and School Site (number 4 on Figure 10-46)

These two Developments end up being a social complement to the Proposed Development and the *Glenveagh Development*, ending up having a much lower built occupation of the land, and therefore an equally lower impact on the landscape. In terms of visual impact, they are framed by peripheral hedges that are almost entirely kept.

There are also 3 empty areas that remain undeveloped, south of the Proposed Development

- Area zoned as “Mixed-use” by the Westmeath County Development Plan (number 5 on Figure 10-46)

- Area zoned as Proposed Residential” by the Westmeath County Development Plan (number 6 on Figure 10-46)

- Area zoned as “Open Space” by the Westmeath County Development Plan (number 7 on Figure 10-46)

Figure 10-46: Context Master Plan. Source: Park Hood Chartered Landscape Architects

10.7 "Do Nothing" Impact

The do-nothing impact refers to the non-implementation of the Proposed Development. The primary effect of this would be that the impacts and effects identified would not directly occur. In the event that the development does not proceed it is very likely that the Proposed Development site would be developed in the future in line with its zoning. If the site is left in its current state, it will be likely continued to be maintained in its current manner and hence a neutral impact will persist on the existing landscape.

10.8 Avoidance, Remedial & Mitigation Measures

The key landscape and visual mitigation measures used during the Construction Phase have been incorporated into the layout of the site and design of the proposed buildings. The buildings will be low height (2-4 storey). Height and massing of the development has been given careful consideration and is considered appropriate having regard to the site's outer suburban location whilst also respecting the local context and the sloping topography of the site. Careful consideration has been given to the scale, bulk, massing and siting of the residential units. This design approach now also ensures a reduced level of engineering and site works required to accommodate the development.

A variety of materials are proposed within the development to provide visual interest and to create a distinct sense of place. The overall aesthetic concept is one of coherence and quality, balancing integration with the surrounding context and also providing for a unique and modern identity.

The measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the Site is kept tidy, dust is kept to a minimum, and that any locations close to public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound(s) and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

For those trees proposed for retention, all necessary mitigation measures will be put in place in order to prevent or reduce impact to its very minimum. Mitigation measures used will need to include the erection of protective fencing at the very start of the works, ground protection installation within root zones where fencing cannot be erected to enclose the entire root zones, monitoring of the site works by the project Arboriculturist throughout the construction process and the use of tree friendly techniques and products for the construction process.

10.9 "Worst Case" Scenario

The worst-case effects arise when the mitigation measures as proposed substantially fail. This would result in landscape and visual impacts lasting in the medium to long term as due to the location of the Proposed Development on valuable zone land it would be highly likely that it would be redeveloped in the near future.

The failure of the proposed landscape mitigation measures is very unlikely. Also, if the Proposed Development is granted, the proposed landscaping will become a part of the plans and particulars of the planning application and as such can be made subject of an enforcement notice by the local authority to rectify the situation.

10.10 Residual Impacts

Residual Impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining '*environmental costs'* of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment. No negative residual impacts in the context of landscape and visual impact are anticipated regarding this Proposed Development.

10.10.1 Construction Phase

Notwithstanding the proposed ameliorative and mitigation measures proposed during the Construction Phase, it is considered that the initial development of the site, including removal of trees and hedgerows and general construction activity will result in overall residual effects that are moderate, negative temporary impacts and ongoing residual effects that will be moderate, neutral short-term impacts by the closest receptors and reduce rapidly with distance to impacts which are minor/negligible, neutral short term impacts.

10.10.2 Operational Phase

On completion, the disturbance and change associated with the construction stage will be gradually altered by the influence that the new development establishes on the character and visual context of its environs. In this regard it is considered that the Proposed Development of the site will have a residual minor local impact on the landscape character of its environs and reduce rapidly with distance to impacts which are negligible, neutral long-term impacts.

10.11 Monitoring

10.11.1 Construction Phase

Landscape tender drawings and specifications have been produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect. The planting works will be undertaken in the planting season after completion of the main civil engineering and building work.

Any construction works within close proximity to retained trees are advised to be undertaken in accordance with approved method statements prepared by the construction contractor under the direct supervision of a qualified consultant Arboriculturist. Therefore, during the construction works, a professionally qualified Arboriculturist is recommended to be retained by the principal contractor or site manager to monitor and advice on any works within the RPA of retained trees to ensure successful tree retention and planning compliance. The Arboriculturist is to make regular site visits to ensure that the tree protection measures are in place and adhered to.

10.11.2 Operational Phase

Monitoring of the mitigation measures will form part of the landscape management plan. Replacement trees, replacement planting and pruning measures will be captured in landscape maintenance plans and are intrinsically linked to the proposed mitigation measures. All landscape works will be in an establishment phase for the initial three years from planting. A landscape maintenance plan accompanies the planning application. Prior to completion of the landscape works, a competent landscape contractor will be engaged and a detailed maintenance plan, scope of operation and methodology will be put in place.

10.12 Interactions

Interactions between Landscape and Visual Impact and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

10.12.1 Population and Human Health

It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the suburban village and residential nature of the surrounding landscape, will cause any issues for the residential local population.

10.12.2 Biodiversity

The proposed landscaping of the Site interacts with its biodiversity and ecology through the changes that will occur to the existing habitats and flora at the Site. The landscaping proposals will entail losses and contributions in terms of vegetation at the Site, which in turn will affect the ecology of the Site. The proposed landscaping will not result in significant adverse effects in this regard.

It is noted that the Proposed Development further negates any habitat loss through the provision of a number of planted garden areas included in the project design. As such, no significant cumulative habitat loss will occur involving the Proposed Development.

10.12.3 Archaeology and Cultural Heritage

As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.

10.13 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter.

10.14 Conclusion

The Proposed Development will not have any landscape or visual impact in any Protected View, Scenic Route or Protected Structure identified in the Westmeath County Development Plan 2021-2027.

In terms of the LIA, the majority of the existing trees are kept, felling only 38 of a total of 111 existing trees, the majority being evaluated with “poor” conditions. Considering that 420 new trees are planted, there is a clear ecological/landscape benefit. The predicted landscape impacts will reduce rapidly with distance from the site boundaries. Intervening hedgerows, open park spaces, and existing buildings will further reduce the impacts to minor to negligible, negative and short term for the Construction Phase. It is concluded that the Proposed Development will have a minor, negative and short to medium-term impact on the landscape character of the site during the Construction Phase. It is not expected that the Operational phase of the Proposed Development will cause any negative impact.

In what refers to the VIA, 9 viewpoints were assessed, chosen by sensitivity of the view’s trough site visits and Viewsheds analysis. As it can be seen by the conclusion on the visual effects (Chapter 10.5.2.5). Of the 9 selected viewpoints, 33% will have temporary visual impacts and 33% will have short-term or short to medium-term visual impacts. Regarding quality, 67% of the points are considered neutral and 33% minor to moderate or moderate visual impacts. No viewpoints are considered as having a significant, negative and long-term impact. It’s concluded that the proposed green structure will mitigate, in the medium-term, the identified moderate visual impacts.

It is considered, in the context of the Development Plan zoning, the Proposed Development is a continuation of existing trends in the local area.

10.15 References

- Westmeath County Development Plan 2021-2027
- Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Report (2022)
- The Landscape Institute, ‘Guidelines for Landscape and Visual Impact Assessment’, (3rd Edition) 2013
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute
- ‘The Countryside Agency and Scottish Natural Heritage – Landscape Character Assessment Guidance for England and Scotland’ 2002
- EPA Advice notes on current practice in the preparation of environment impact statements (2003)

- EPA - Environmental Management Guidelines - Environmental Management in the Extractive Industry
- Section 177F of the Planning and Development Act 2000 (as amended)
- A Handbook on Environmental Impact Assessment, Scottish Natural Heritage
- Journal of Environmental Psychology, Visual Thresholds for Detection, Recognition and Visual Impact in Landscape Settings (H. Shang and I.D. Bishop, 2000)
- Landscape design with plants, Brian Clouston
- Atlas of the Irish rural landscape, Aalen, Whelen, Stout

11 ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 Introduction

This chapter of the EIAR describes and assesses the potential effects of the Proposed Development, located at Cornamaddy, Co. Westmeath on Archaeology, Cultural Heritage and Architectural Heritage.

The aim of this chapter is to assess the baseline Archaeological, Architectural and Cultural Heritage conditions of the surrounding environment for the Proposed Development, in order to determine any significant impacts that may arise as a result of the Proposed Development and highlight any potential effects this may have on these resources. In addition, mitigation measures are recommended, in accordance with the policies of Westmeath County Council, the Department of Arts, Heritage, Regional, Rural and Gaeltacht affairs, the National Monuments Acts 1930-2004 and best practice guidelines.

The assessment comprised a paper survey and cartographic research. The sources used were the Record of Monument and Places (RMP), Department of Culture, Heritage and the Gaeltacht (DoCHG), the National Museum of Ireland topographical files, the County Development plans and various literature resources.

The RMP is comprised of manuals listing all known archaeological sites and monuments in each County with accompanying maps locating these sites and additional information from archaeological excavations and assessment records in the intervening period. All sites included in the RMP are protected under the National Monuments Acts (1930-2004). The record is continually updated with information from the results of on-going research and excavation, as new sites are discovered. The types of Recorded National Monuments, both within the study area and in the immediate vicinity, have served to inform the author in the development of a hypothesis as to the potential sub-surface archaeology within the study area. This is backed up by the results of previous archaeological excavations and investigations both within and without the study area published in excavation summary reports for each year (www.excavations.ie).

The National Museum maintains a register of finds of archaeological objects from each townland in the twenty-six counties of the Republic of Ireland. Detailed records are held for each find, many of which are regarded as ‘stray finds’ having been recovered by farmers in the course of ploughing or other such activities and received to the museum in accordance with national monuments legislation. The records contain information such as type and location of find, correspondence between the museum and the finder, and, where applicable, results of excavations carried out by museum staff at the location of the finds.

The Westmeath County Development Plan (2021-2027) has a list of protected structures which has established the preservation of these structures including their settings. The Record of Protected Structures was established under the Local Government (Planning and Development) Act 2000 and comprises a listing of structures of architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest, along with accompanying maps. It also safeguards the protected structures along with their curtilage

against any development without the express permission of the Minister for the Department of Arts Heritage and the Gaeltacht.

A number of literary sources and Cartographic maps were also consulted. Literary sources are a valuable means of completing the written archaeological record of an area and gaining insight into the history of the environs of the proposed works. The principal sources consulted are listed in the bibliography at the end of this chapter. Cartographic maps consulted were the OS 6-inch first edition mapping (1837-1842), 25-inch mapping series (1889-1913) and third edition (1909) for Co. Westmeath.

11.1.1 Quality Assurance and Competence

This Chapter was prepared by Arthur Greene, Graduate Environmental Consultant, Enviroguide Consulting. Arthur has a Master of Science (Hons) in Ecosystem Science and Policy from University College Dublin and Justus Liebig University and a Bachelor of Arts (Hons) in Geography from Trinity College Dublin. Arthur has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction Chapters, Archaeology Chapters and Archaeology and Cultural Heritage Chapters of EIARs.

11.2 Study Methodology

11.2.1 Guidance and Legislation

The following legislation and guidance documents were consulted as part of this assessment. This legislation makes up the main legal mechanisms by which Archaeological, Architectural and Cultural Heritage resources are protected in Ireland.

- National Monuments Act, 1930-2014;
- Heritage Act, 1995;
- Architectural Heritage and Historic Properties Act, 1999;
- Local Government (Planning and Development) Act, 2000
- The Planning and Development (Strategic Infrastructure) Act, 2006;
- EPA 'Advice Notes for preparing Environmental Impact Statements' (Draft 2015);
- EPA ‘Guidelines on the Information to be Contained in Environmental Impact Statements’ (EPA, 2002);
- EPA ‘Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (EPA, May 2022);
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, Department of Arts, Heritage, Gaeltacht and Islands;
- Architectural Heritage Protection: Guidelines for Planning Authorities, 2011, (formerly) Department of Arts, Heritage and the Gaeltacht.

The assessment contained in this chapter has involved a desktop study / paper survey which considered all available archaeological, architectural, historical and cartographic sources. This information was used in order to assess any potential impact on the receiving environment and to identify measures to ensure the conservation of any monuments or features.

11.2.2 Desk Study

The following archaeological, historical and cartographic sources were examined as part of the paper study:

Records of Monuments and Places (RMP) is a list of monuments recorded under Section 12 (1) of the National Monuments (Amendment) Act 1994.

Sites and Monuments Record (SMR) is a national baseline database of known archaeological sites and monuments in Ireland.

Topographical Files of the National Museum of Ireland is an archive containing records of all finds logged by the National Museum.

Aerial Photographs provide an important archaeological resource in terms of detecting new sites and identifying the exact location and extent of known sites. These features can be identified through surface anomalies such as earthworks or distinct vegetation marks.

Excavations Bulletin is an annual publication, started in 1970, which summarises all archaeological excavations carried out in Ireland each year (www.excavations.ie).

The National Inventory of Architectural Heritage is a comprehensive database of structures relating to the architectural heritage of Ireland.

Westmeath County Development Plan (2021-2027) contains a list of Architectural Conservation Areas and recorded Protected Structures for County Westmeath.

Cartographic Sources are important in providing topographical information on areas of archaeological potential as well as tracing land use development within the Proposed Development area.

11.3 The Existing and Receiving Environment (Baseline Situation)

The immediate surrounding landscape is rural and agricultural in nature. The Site of the Proposed Development is former agricultural land, with no buildings present. There are a number of residential dwellings located close to the site boundary. The Historic six-inch and Historic twenty-five inch were also consulted; these maps show the Proposed Development Site and surrounding areas as a series of agricultural fields divided by field boundaries. This similar layout is recorded in all maps consulted. The Records of Monuments and Places was consulted and found 13 no. recorded archaeological monuments within 2 km radius of the Proposed Development. The National Inventory of Architectural Heritage (NIAH) was reviewed in order to identify any buildings/features of architectural significance within 2km of the Site. There are 2 buildings of architectural significance located with 2km of the Site; Rose Cottage (Reg. No. 15402921) and Bullet Road (15402920), both located 1.1 km Northwest of the Proposed Development.

RMP files (Record of Monuments and Places) close to the study area

Within a 2 km radius of the Site there are 13 no. recorded archaeological monuments. The monuments are listed below, and identified by townland, RMP number, site type, site status and distance of the site for the Proposed Development. The RMP reference consists of a three-letter county code, the relevant number of the Ordnance Survey six-inch sheet on which the Site is located, and the number of the individual monument. This information is gathered from the online Historic Environment Viewer provided by the Department of Culture, Heritage, and the Gaeltacht. These monuments are discussed below within the context of the historical and archaeological background of the surrounding area. No Recorded Monuments will be affected by the development plans. No Recorded Monuments will be affected by the development plans.

RMP No.: WM029-004----

Townland: Ballykeeran

Site Type: Rabbit Warren

Description: Situated at the end of a low rise, with good views of the surrounding countryside. Annotated Depicted 'Rabbit Burrow' on the 1837 OS 6-inch map and depicted as a large circular-shaped shaded area delimited by a perforated line. Monument described in 1973 as no surface remains visible. No surface remains visible today of rabbit burrow on Digital Globe aerial photography.

RMP No.: WM029-023---

Townland: Collegeland

Site Type: Children's burial ground

Description: Situated on flat, well drained pasture, on the east side of Athlone town. Lissahearin Grave Yard consisted of a roughly circular-shaped area (diam. 19m) enclosed by a low bank of earth and stone with is no trace of an external fosse. The perimeter of the earthwork is planted with mature beech and elm trees. The interior is relatively level with stones scattered on the surface and a low stony outcrop in the east quadrant. The monument resembles a small ringfort. According to Rev. J. Pinkman (1945, 47) 'Lissaherin' refers to Ahern's Fort which lies close to the South side of the Athlone to Mullingar railway line, about half a mile from Athlone town. It was previously used as a burial place for unbaptized children. The Ordnance Survey suggested that this monument may have been a small ringfort that was reused as a children's burial ground. Monument is visible today as a roughly circular-shaped tree-planted earthwork on Digital Globe aerial photography which is within a trapezoidal-shaped, undeveloped green area, within a modern housing estate.

RMP No.: WM029-022----

Townland: Retreat

Site Type: Military Camp

Description: Situated in a low-lying area, now occupied by a housing estate, on the East side of Athlone town. Depicted on the 1837 ed. OS 6-inch map as a small oval-shaped pond, known locally as the 'The Doctor's Pool'. Depicted on the revised 1910 ed. OS 25-inch map as a perfectly circular-shaped feature. Area named 'Cannonsfield' on the revised 1953 OS 6-inch map. According to Murtagh (1970, 84, 87), the Williamites arrived in Athlone on 17 July 1690 and established a military camp about a quarter of a mile from the town. Strong local tradition confirms that the encampment was at a pond called 'The Doctor's Pool' where the troops washed their clothes and tended their wounds. Burials of soldiers killed in the siege were interred in the immediate vicinity of the pond. It is possible that the locality was similarly utilised during the second siege in 1691. Monument is described in 1983 as a natural depression which is currently dried out, yet is likely to be waterlogged in winter. Pond is not visible today on Digital Globe aerial photography as the area is occupied by a modern housing estate.

RMP No.: WM029-002----

Townland: Clonbrusk

Site Type: Standing Stone - pair

Description: Sited on top of a natural pointed hillock (which appears to be scarped slightly at its base) are two large limestone slabs/boulders (E stone L. 3.8m x 1.25m; W stone L. 3.1m x 1.7m). One lies flat and the on the east side is on its edge but is tilted westwards towards the west slab/stone. The top of the hillcok has a small circular flat shape. There is a quarry on the Southeast siude of the hillock and a fairly gentle slope to the hillock at the West and North. Known locally as the 'Druid's Altar' (English, N. W. JOAS, 1, 1969, 4).

RMP No.: WM029-047----

Townland: Cornamagh

Site Type: Promontory Fort - inland

Description: Outline of irregular-shaped enclosure (approx. dims. 86m N-S x 50m E-W) overlooking Cornamagh Lough visible on Google earth aerial imagery and other OSi aerial photos.

RMP No.: WM022-039----

Townland: Garrynafela

Site Type: Castle - unclassified

Description: No surface remains of a castle depicted at this location on Larkin's 1808 map of Co. Westmeath (NLI, MS 46,580).

RMP No.: WM029-003----

Townland: Ballykeeran

Site Type: Earthwork

Description: Situated on the edge of a ridge or rise, in woodland, overlooking Ballaghkeeran Lough to N. Depicted on the 1837 OS 6-inch map as circular-shaped tree-lined earthwork and on the revised 1913 ed. OS 25-inch map as a subtriangular-shaped earthwork which seems to have been incorporated into a ‘Gravel Pit’ to North.

Monument described in 1973 as a large roughly rectangular-shaped area now densely overgrown with impenetrable vegetation and largely inaccessible. The earthwork is defined by a very high steep scarp along the N side, which has been quarried. This quarry extends across most of the East half. The monument is defined by a steep bank to Southeast and West. There are the remains of an outer fosse along the Southeast side, beyond which is a field boundary consisting of a hedge-lined bank. Monument is visible today as a small coppice of woodland on Digital Globe aerial photography.

RMP No.: WM022-041003-

Townland: Ballaghkeeran Little

Site Type: Pier/Jetty

Description: Situated on the west shoreline of a promontory jutting out into the southern end of Ballaghkeeran Bay in Killinure Lough at southeast end of Lough Ree. The Breensford River lies c. 50m to south, with possible promontory fort (WM022-041----) immediately to east Monument described in 1981 as the remains of a possible jetty located on a scarp, which was revealed by a drop in the level of water on the lake. It is composed of four horizontal oak planks jutting out into the lough, bearing sapwood, black in colour and of obvious antiquity.

The planks are embedded in a grey-red marl, which is obvious shoreline silt, and lie in a layer (T 0.1m) of charcoal and mixed habitation material.

RMP No.: WM022-041----

Townland: Ballaghkeeran Little

Site Type: Promontory fort - inland

Description: Situated on a promontory jutting out into the south end of Ballaghkeeran Bay in Killinure Lough at southeast end of Lough Ree. The Breensford River runs c. 90m to south which forms the townland boundary with Ballykeeran. Monument described in 1976-1981 as an oval-shaped area (approx. dims. 130m North-South; 90m East-West) situated on a promontory which is separated from the mainland by an inner bank, an intervening fosse and an outer bank from Northeast-East-South-Southwest and defined by a steep scarp rising from the lakeshore from Southwest-West-North- Northeast. The inner bank (max. H 1m; Wth 2m) is almost reduced to a scarp and rises level with the interior. The intervening fosse (Wth 3-5m) is relatively wide. A low, wide outer bank (Wth 5-7m; H 0.3m) is visible outside the fosse from Northeast-Southwest. A modern drain has been cut through the fosse along the East side and similar drains cut through the outer bank at Southeast. A house site (WM022-041001-) is visible in the Southeast quadrant of the enclosure. The remainder of the interior is covered by lazy-beds running East-West. Reputed locally to be the site of a Viking longphort, however there is little surface evidence to suggest that it is Viking in date. The site was recorded and excavated by Mr. T. Fanning, University College Galway between 1980-84 (www.excavations.ie). An oak planked jetty (WM022-041003-) is located on the shoreline to the immediate West of the enclosure and a house site (WM022-041002-) is visible to the immediate Northeast. A possible burial mound (WM022-041004-), also reputed to be Viking in date, lies c. 35m to South.

RMP No.: WM022-041001-

Townland: Ballaghkeeran Little

Site Type: House - indeterminate date

Description: Situated on a promontory jutting out into the South end of Ballaghkeeran Bay in Killinure Lough at Southeast end of Lough Ree. The Breensford River lies c. 90m to South. Monument described in 1976-1981 as located in the Southeast corner of the interior of a possible promontory fort (WM022-041----) are the sod-covered remains of a square-shaped house foundation. A second house site lies outside, to the immediate Northeast of the fort (WM022-041----).

RMP No.: WM022-041004-

Townland: Ballaghkeeran Little

Site Type: Burial mound

Description: Situated in a small field, on the E shore of Ballaghkeeran Bay in Killinure Lough at Southeast end of Lough Ree. Possible promontory fort (WM022-041----) lies c. 35m to North. Monument described in 1978 as a low circular mound of earth. According to Mr Olav Johansen, who visited the site, this may represent a Viking burial. This could only be confirmed by further investigation such as geophysics and/or excavation.

RMP No.: WM022-041002-

Townland: Ballaghkeeran Little

Site Type: House - indeterminate date

Description: Situated to the immediate Norhteast of a promontory jutting out into the South end of Ballaghkeeran Bay in Killinure Lough at Southeast end of Lough Ree. The Breensford River lies c. 215m to Southwest. Monument described in 1976-1981 as immediately adjacent to the Norhteast of a possible promontory fort (WM022-041----) is a flat rectangular platform defined by a very slight embankment. A second house site (WM022-041001-) lies within the Southeast area of the fort (WM022-041----).

RMP No.: WM029-041----

Townland: Garrynafela

Site Type: Barrow – mound barrow

Description: Situated at North end of natural ridge in undulating pasture with good views in all directions. High oval-shaped flat-topped mound (top dims. 7.8m x 6.28m; base diam. c. 31m NE-SW x 24m NW-SE) of earth and stones with no evidence of an enclosing fosse or any other feature associated with the mound. The sides of the mound are quite steep on West, North and East sides. The Norhteast side of the mound has been damaged by quarrying and there are some thorn bushes growing on the monument at this location. Possible mound barrow classification as it would appear to be too small to classify as a small motte (SMR File 06/06/1985). Mound barrow placed on the Register of Historic Monuments on the 18/06/1986

11.3.1 Topographical files, National Museum of Ireland (NMI)

There are 1 no. topographical files on the Site of the Proposed Development in the National Museum files.

Site Name: 2004:180

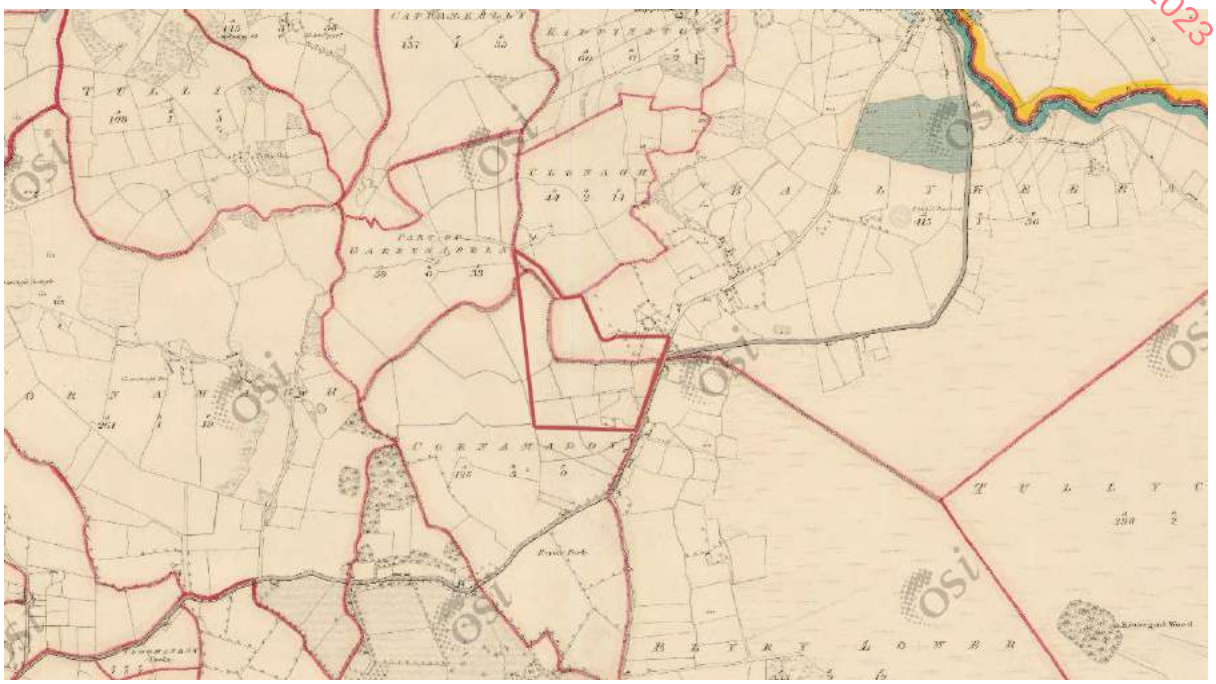
Object Type: Socketed axehead/5 coins

Distance to Site: 1.7 km southwest of Proposed Development

11.3.2 Cartographic Analysis

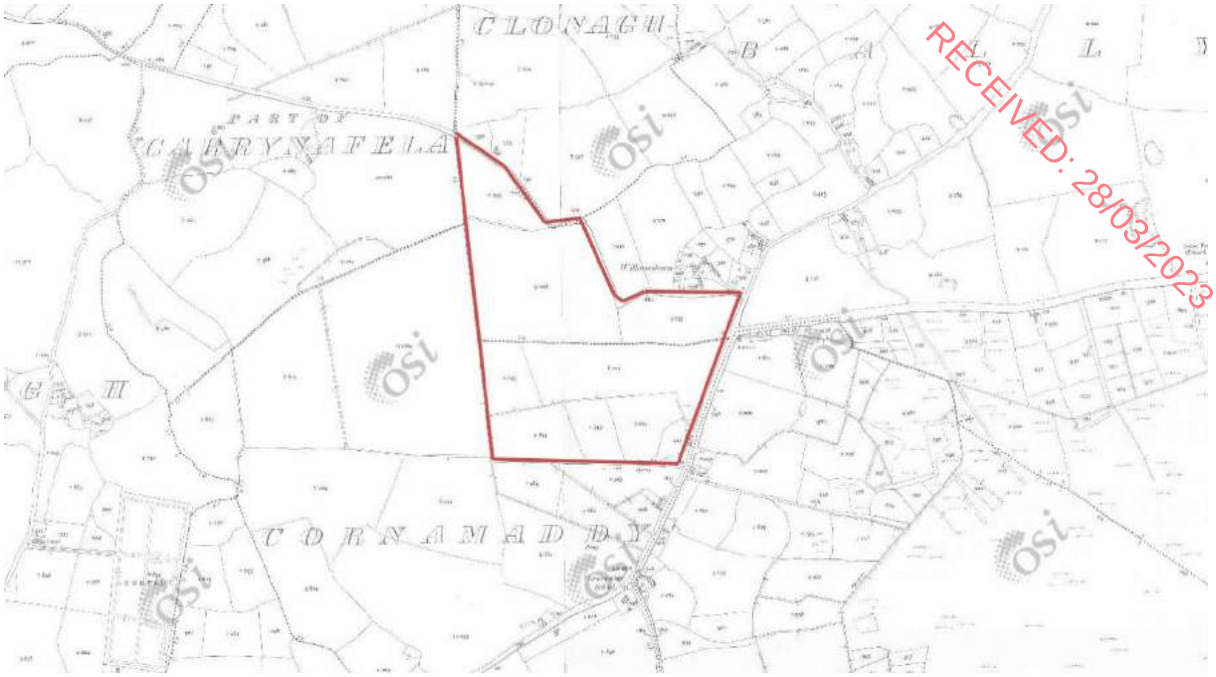
11.3.2.1 Historic six-inch Ordinance Survey Map, 1827-1842

The first edition of the six-inch Ordnance Survey map was carried out from 1837-1842. This map shows the Proposed Development Site and surrounding areas as a series of agricultural fields divided by field boundaries. This similar layout is recorded in all maps consulted.



11.3.2.2 Historic twenty-five-inch Ordinance Survey Map, 1827-1842

The first edition of the twenty-five-inch Ordnance Survey map was carried out from 1837-1842. This map shows the Proposed Development Site and surrounding areas as a series of agricultural fields divided by field boundaries. This similar layout is recorded in all maps consulted.



11.3.3 Excavations

Excavations.ie contains summary accounts of all the excavations carried out in Ireland – North and South – from 1970 to 2018. This dataset is compiled in order to provide summary accounts of all excavations carried out on the island of Ireland. The Database recorded 5 no. excavations within 2 km of the Proposed Development. The closest registered excavation is located 1.45 km Southwest of the Proposed Development.

Site Name: Ballaghkeeran Little

Sites and Monuments Record No.: N/A

License No.: -

Site Type: Possible Viking Longphort

Site Name: Garrycastle, Athlone

Sites and Monuments Record No.: N/A

License No.: 09E0440 ext.

Site Type: No archaeological significance

Site Name: Lissywollen

Sites and Monuments Record No.: N/A

License No.: 06E0713

Site Type: No archaeological significance

Site Name: Retreat Park, Athlone

Sites and Monuments Record No.: SMR 29:22

License No.: 98E0308

Site Type: Enclosure

Site Name: Glasson/Ballykeeran Sewerage Scheme, Ballaghkeeran Little/Ballykeeran/ Deerpark/Garrynafela/Portaneena

Sites and Monuments Record No.: N/A

License No.: 08E0903

Site Type: No archaeological significance

11.3.4 Westmeath County Development Plan 2021-2027

The Westmeath County Council Development Plan addresses Architectural Conservation Areas, historic areas and Protected Structures, and recognises the statutory protection afforded to all Records of Monuments and Places (RMP) and all archaeological heritage sites under the National Monuments Legislation (1930-2004), and the development plan lists a number of aims and objectives in relation to archaeological and architectural heritage.

11.3.4.1 Architecture

Protection is also recognised to areas of cohesive architectural value and these areas can be classified as Architectural Conservation Areas (ACA), and any works that may have a material effect on the special character of an ACA needs planning permission. An area can be designated an ACA often because it contains a group of historic buildings or has a distinctive street size/plot size that contributes to the distinct character of a town or village. In County Westmeath, there are 25 no. Architectural Conservation Area Locations, as follows:

Athlone	Town Centre
	Church Street and Connaught Street
	Church Street and Connaught Street
	St. Brigid's Terrace
	Garden Vale
	Goldsmith Terrace
	St. Columba's Terrace
	Riverside Place
	Coosan Point Road
Mullingar	Town centre
	Ginnell Terrace
	Millmount Road
	Fairview Terrace, part of Auburn Road
	St. Brigid's Terrace
	Harbour Street
Tyrellspass	Village centre including the Village Green

	Belvedere Orphanage
Ballynacarrigy	Main Street
Castlepollard	The Square and surrounding streetscape extending along the Dublin Road and Church Street
Clonmellon	Main Street and St John's Church
Kilbeggan	The Distillery and Main Street, including the Market Square
Multyfarnham	Village core to the west of the River Gaine
Rochfortbridge	Derrygreenagh Park
Moate	Main Street and The Newtown
Glasson	Main Street

The closest ACA is St. Mary's Place within the Athlone Settlement, located 2.2 km southwest of the Proposed Development. Due to distance and intervening environmental between the ACA and the site, no significant adverse impacts are expected.

11.3.4.2 Protected Structures

A protected structure is a structure or part of a structure that a planning authority considers to be a special interest from an "architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest".

In certain circumstances, some archaeological structures may also be considered as architectural heritage, meaning they may therefore appear on both the Record of Monuments and Places (RMP) and the Record of Protected Structures (RPS). These structures are protected by both the National Monuments Acts and the Planning and Development Acts 2000 (as amended).

There are 3 no. Protected Structures located within a 2km radius of the Proposed Development.

RPS No.: 029-010

Structure: Detached four-bay single-storey vernacular house

Address: Ballykeeran

Description: Detached four-bay single-storey vernacular house, built c.1820. Pitched thatched roof with decorated ridge work, raised rendered verges to either end (north and south) and two central rendered chimneystacks.

Appraisal: A highly appealing example of a thatched vernacular house, which retains its early form, character and fabric. Buildings of this type were once very numerous in the Irish countryside.

Rating: Regional

Distance: 1.1 km Northeast of Proposed Development

RPS No.: 029-011

Structure: Detached four-bay single-storey thatched cottage

Address: Ballykeeran

Description: Detached four-bay single-storey thatched cottage, built c.1820, having a projecting flat-roofed entrance porch to the main elevation (east). Modern extension to the south. Pitched thatched roof with decorated ridge work and a rendered chimneystack.

Appraisal: An appealing example of a thatched vernacular house, which retains its early form and character despite some alterations to the openings. Buildings of this type were once very numerous in the Irish countryside.

Rating: Regional

Distance: 1.1 km Northeast of Proposed Development

RPS No.: 029-013

Structure: Our Lady Queen of Peace

Address: Clonbrusk

Description: Freestanding Roman Catholic church on rectilinear plan, built in 1973. Hipped/pyramidal slate roof having an roof lantern, offset towards the centre, rising to a spire on rectilinear plan. Cross finial over.

Appraisal: An interesting and bold example of a post. Second Vatican Council (1963-5) Roman Catholic church. It retains its original form and character. The unusual spire/lantern is an interesting feature of some design merit and is a local landmark.

Rating: Regional

Distance: 1.9 km west of the Proposed Development

11.3.4.3 Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) was reviewed in order to identify any buildings/features of architectural significance within 2 km of the Site. The NIAH Registration Number refers to the registration number on the National Inventory of Architectural Heritage building survey of County Westmeath. The NIAH is a section within the Department of the Arts Heritage and the Gaeltacht, and the work involves identifying and recording the architectural heritage of Ireland from 1700 to present day Ireland. It is important to note that there may be structures in the NIAH survey that are also included in the RPS, however not all of them are. There are 3 no. buildings/features of architectural significance are located with 2 km of the Proposed Development Site. Information from the National Inventory of Architectural Heritage on these buildings and their features are given below.

Reg. No.: 15402923

Date: 1970 - 1980

Original Use: Church/chapel

Categories of Special Interest:

Description: Freestanding Roman Catholic church on rectilinear-plan, built in 1973. Hipped/pyramidal slate roof having a roof lantern, offset towards the centre, rising to a spire on rectilinear plan. Cross finial over. Roof has wide overhanging eaves with windows underneath lighting the interior of church. Constructed of grey brick and exposed reinforced concrete. Square-headed window and door openings. Interesting and spacious interior with ribbed concrete ceiling. Set back from road in own grounds to the north of Athlone Town.

Distance: 1.9 km

Impact: No perceived negative impact as a result of the Proposed Development.

Reg. No.: 15402920

Date: 1800-1840

Original Use: House

Categories of Special Interest:

Description: Detached four-bay single-storey vernacular house, built c.1820. Pitched thatched roof with decorated ridge work, raised rendered verges to either end (north and south) and two central rendered chimneystacks. Whitewashed rubble stone walls with square-headed window openings having two-over-two pane timber sliding sash windows. Square-headed doorcase having replacement timber glazed half-door. Set back from road with whitewashed rubble stone boundary wall to the west. Located to the south of Ballykerran.

Distance: 1.1 km

Impact: No perceived negative impact as a result of the Proposed Development.

Reg. No.: 15402921

Date: 1800-1850

Original Use: House

Categories of Special Interest:

Description: Detached four-bay single-storey thatched cottage, built c.1820, having a projecting flat-roofed entrance porch to the main elevation (east). Modern extension to the south. Pitched thatched roof with decorated ridge work and a rendered chimneystack. Roughcast rendered walls with square-headed window openings having replacement windows. Square-headed doorcase to porch having replacement timber glazed door. Set back from road with roughcast rendered boundary wall to the east. Located to the south of Ballykerran.

Distance: 1.1 km

Impact: No perceived negative impact as a result of the Proposed Development.

11.3.4.4 Excavations Database

Excavations.ie contains summary accounts of all the excavations carried out in Ireland – North and South – from 1970 to 2018. This dataset is compiled in order to provide summary accounts of all excavations carried out on the island of Ireland. The Database recorded 3 no. excavations within 2 km of the Proposed Development.

Site Name: Glasson/Ballykeeran Sewerage Scheme, Ballaghkeeran Little/Ballykeeran/ Deerpark/Garrynafela/Portaneena

Sites and Monuments Record No.: N/A

License No.: 08E0903

Site Type: No archaeological significance

Distance: 1.5 km

Site Name: Ballaghkeeran Little

Sites and Monuments Record No.: N/A

License No.: -

Site Type: Possible Viking Longphort

Distance: 1.7 km

Site Name: Garrycastle, Athlone

Sites and Monuments Record No.: N/A

License No.: 09E0440 ext.

Site Type: No archaeological significance

Distance: 1.9 km

11.4 Description of the Proposed Development

The Proposed Development will consist of residential and landscaping on existing agricultural land. The Proposed Development is described in Chapter 02.

11.5 Potential Impact of the Proposed Development

11.5.1 Construction Phase

The land for development has been used for agricultural purposes and as such has not been subject to significant groundworks or prior construction. Hence, there is a potential for previously undiscovered sub-surface archaeological features. Although no recorded archaeological sites occur within the development boundary and no features of possible archaeological interest were identified on the field surfaces, the potential for sub-surface archaeological remains being discovered during earthworks and topsoil stripping must be considered.

11.5.2 Operational Phase

The Operational Phase of the Proposed Development will not result in any impact on the Archaeology and Cultural Heritage of the area.

Once appropriate mitigation measures such as pre-development archaeological testing and resolution of any uncovered remains are implemented there will be no archaeological impacts during the construction phase.

11.5.3 Potential Cumulative Impacts

In the context of archaeology and cultural heritage impact, no cumulative effects are anticipated from the Proposed Development.

11.5.4 "Do Nothing" Impact

A Do-nothing scenario would result in the Site remaining as an agricultural field. If the Proposed Development were not to proceed, the existing Site would continue to operate as agricultural, and any archaeological impacts would be avoided.

11.6 Avoidance, Remedial & Mitigation Measures

11.6.1 Construction Phase

It is recommended that a programme of invasive linear test trenching be carried out by a licensed archaeologist in the areas of sub-surface works including re-routing of services, additional drainage, slip roads, and other facilitation works associated with the proposed development site. The purpose of testing is to identify sub surface archaeological remains within the development site and to determine the impact of the proposed development on such remains if they occur. Should archaeological features and or deposits be revealed then any further work would be subject to further licensing with approval from the Department of Arts, Heritage and the Gaeltacht who may recommend preservation *in situ* or preservation by record. The testing should be completed as far in advance of other scheduled site works as possible.

The presence or otherwise of archaeological soils or deposits could also be determined by examining the reports on any engineering bore-holes and test-pits that may be carried out in advance of construction in the waterlogged area.

All recommendations in this report are subject to discussion with and approval from the Department of Arts, Heritage and the Gaeltacht.

11.6.2 Operational Phase

Once appropriate mitigation measures such as pre-development archaeological testing and resolution of any uncovered remains are implemented there will be no archaeological impacts during the construction phase.

11.6.3 "Worst Case" Scenario

If the Proposed Development were to proceed without the implementation of the archaeological mitigation measures outlined, then construction works could result in permanent, direct, significant, negative impacts on any unrecorded, sub-surface archaeological features that exist within the site.

11.7 Residual Impacts

Following the successful implementation of the mitigation measures outlined in Section 11.6.1, no residual impacts on the cultural heritage resource are predicted to arise as a result of the Proposed Development.

11.8 Monitoring

11.8.1 Construction Phase

Should archaeological features and or deposits be revealed during the Construction Phase of the Proposed Development then any further work would be subject to further licensing with approval from the Department of Arts, Heritage and the Gaeltacht who may recommend preservation *in situ* or preservation by record. The testing should be completed as far in advance of other scheduled site works as possible.

Therefore, all ground and earthworks shall be monitored for the presence of previously undiscovered archaeological features.

11.8.2 Operational Phase

Following the successful implementation of the mitigation and monitoring measures outlined above no further monitoring measures will be required during the operational phase.

11.9 Interactions

Interactions between Archaeology and Cultural Heritage and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

11.9.1 Landscape and Visual Impact

As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.

11.9.2 Land/soil

The Proposed Development will involve the movement of soil for the site to reach the required levels. There is potential for previously unrecorded archaeological features or deposits to be discovered during this process.

11.10 Difficulties Encountered When Compiling

There were no difficulties in compiling the specified information with regard to archaeological, architectural and cultural heritage.

11.11 References

Archaeological Survey Database, available at: http://webgis.archaeology.ie/historicenvironment/

Department of Arts, Heritage, Gaeltacht and the Islands (1999b). Policy and Guidelines on Archaeological Excavation. Dublin. Government Publications Office.

Heritage Maps available at: https://heritagemaps.ie/

National Monuments of Ireland database available at: http://webgis.archaeology.ie/historicenvironment/

National Inventory of Archaeological Heritage, available at: http://www.buildingsofireland.ie/Surveys/Buildings/

OSI mapping (www.osi.ie)

https://heritagemaps.ie/WebApps/HeritageMaps/index.html

Westmeath County Development Plan 2021-2027 available at: https://www.westmeathcoco.ie/en/ourservices/planning/developmentplans/countydevelopmentplan2021-2027/

Excavations.ie available at: https://excavations.ie/

12 MATERIAL ASSETS: WASTE AND UTILITIES

12.1 Introduction

Material assets have been defined as "*Resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reason*"' (EPA 2002).

This definition was further expanded by the EPA in 2022 in 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' which states:

> '*The meaning of this factor is less clear than others. In Directive 2011/92/EU it 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. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils*.'

The scope and definition of Material Assets within the context of the EIA process has been defined by the EIA Directive as including Architectural and Archaeological Heritage or Cultural Heritage. These elements are assessed separately in Chapter 11 under Archaeology & Cultural Heritage.

This Chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the potential impacts of the Proposed Development on Material Assets or physical resources in the environment of human origin including built services and infrastructure comprising:

- Electricity Supply,
- Gas Supply,
- Information and Communications Technology,
- Surface Water Drainage,
- Water Supply and Demand,
- Wastewater Management, and
- Waste Management

Natural resources (water, land, biodiversity, air etc.) are addressed in their respective chapters. The Building Lifecycle Report produced by Balrath Engineering (2023), and included in this EIAR as Appendix I, provides details of the materials that are envisaged to be used as building materials for the Proposed Development.

12.1.1 Quality Assurance and Competence

This Chapter was prepared by Louise Hewitt, Environmental Consultant, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, and chapters of EIARs of a similar scale and nature to the Proposed Development.

12.2 Study Methodology

The methodology adopted for the assessment takes cognisance of the relevant guidelines, in particular the following:

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR) (2022); and
- EPA (2021) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects.

The scope of work undertaken for the impact assessment included a desk-based study of built services, utilities and waste management infrastructure within the study area. The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area, including published information and details pertaining to the Proposed Development provided by the Applicant and the Design Team.

Information on built assets in the vicinity of the Site of the Proposed Development was assembled by the following means:

- ESB Networks Utility Maps;
- Irish Water Utility Plans;
- Gas Networks Ireland Service plans;
- EIR E-Maps;
- Planning Application Services Report (EOBMS Consulting Engineers Ltd., 2023) ;
- Building Lifecycle Report (Balrath Engineering, 2023);
- Flood Risk Assessment Stage1 Report (EOBMS Consulting Engineers Ltd., 2023) ;
- Resource and Waste Management Plan (AWN Consulting, 2023);
- Operational Waste Management Plan (AWN Consulting, 2023); and
- Construction Environmental Management Plan (EOBMS Consulting Engineers Ltd., 2023).

All phases of the Proposed Development were considered in the assessment of potential impacts on Material Assets within the study area. Assessment of the likely impact of features of the Proposed Development, was carried out in accordance with the following codes of practice, guidelines, legislation, and plans:

- ESB Networks National Code of Practice for the Customer Interface Version 5 (2021);
- ESB Networks Construction Standards for MV Substation Buildings (2019);
- Irish Water Code of Practice for Water Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2);
- IS EN752, Drain and Sewer Systems Outside Buildings;
- Water Services Acts 2007 to 2017;
- CIRIA Report c753 “The SuDS Manual” (2015);
- Section 3.2 of the Urban Development and Building Heights: Guidelines for Planning Authorities (2018);
- Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851;
- European Union (Waste Directive) Regulations 2011 - 2020, S.I. No. 323 of 2020;
- Waste Management Acts 1996 to 2011; and

- Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021.

12.2.1 Prediction and Assessment of Impacts

Impacts were predicted and assessed based on the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022), and by using the definitions detailed in Tables 12-1 to 12-5. Impacts vary from negative to neutral or positive, and also vary in significance on the receiving environment.

Table 12-1: Terminology used to assess the quality potential impacts & effects

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment.
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment.

Source: EPA, 2022

Table 12-2: Terminology used to assess the significance of potential impacts & effects

Significance of Effects / Impacts	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	An effect which causes noticeable changes in the character of the environment 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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Source: EPA, 2022

Table 12-3: Terminology used to assess the duration of potential impacts/effects

Duration of Effects / Impacts	Definition
Momentary	Effects lasting from seconds to minutes
Brief	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

Duration of Effects / Impacts	Definition
Reversible	Effects that can be undone, for example through remediation or restoration

Source: EPA, 2022

Table 12-4: Definition of the Extent and Context of Effects

Quality	Definition
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Source: EPA, 2022

Table 12-5: Definition of the Probability of Effects

Quality	Definition
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Source: EPA, 2022 (extracted from the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022) shows how the character of the predicted impact in relation to the sensitivity of the receiving environment can determine the significance of the impact.

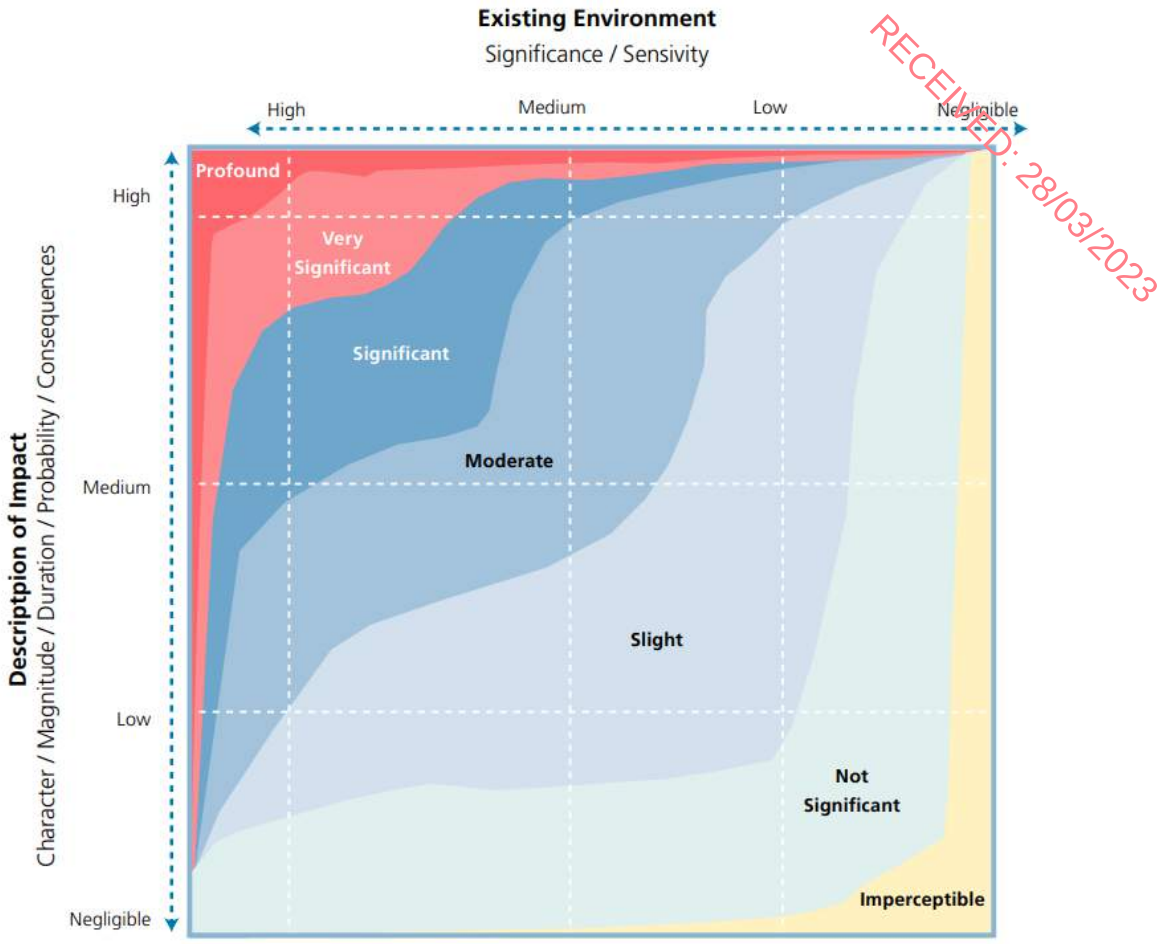


Figure 12-1 Chart showing typical classifications of the significance of impacts (EPA, 2022, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports)

12.3 The Existing and Receiving Environment (Baseline Situation)

12.3.1 Site Location

The Proposed Development site is located within the townlands of Ballkeeran and Cornamaddy Athlone, Co. Westmeath. It lies to the north-western side of the N55 road. The site is currently a greenfield site with surrounding land use comprised of residential, commercial, and civic land use. Immediately adjacent to the site boundary is the BMW Athlone site and residential developments.

The main vehicular entrance location for the site is off a new access road from the N55 round about which also provides access for the adjoining site to be developed by Marina Quarter Ltd. (Planning reference 22/253: granted permission on the 6th December 2022). The site area comprises a greenfield parcel of lands measuring 12.28 hectares.

12.3.1.1 Land Use History

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2023) were reviewed and key observations on-site and off-site are summarised in Table 12-6.

Table 12-6: Historical Land Use

Date	Information Source	Site Description
1995	**OSI Aerial photography**	On-site: No significant changes Off-site: No significant changes
2000	**OSI Aerial photography**	On-site: No significant changes Off-site: No significant changes
2005	**OSI Aerial photography**	On-site: No significant changes Off-site: No significant changes
2005-2013	**OSI Aerial photography**	On-site: No significant changes Off-site: No significant changes
2022	**Google Maps Photography**	On-site: No significant changes Off-site: Colm Quinn BMW Athlone constructed to the east of the site.

12.3.2 Immediate Surroundings

The Proposed Development is bound by single residential dwellings to the north, a commercial unit to the east (BMW car dealership), the approved residential scheme to be developed by Marina Quarter Ltd. is located to the west (Planning reference 22/253) and several existing residential developments are located to the south (Drumaconn, The Ordhard and Woodville).

12.3.3 Local Settlement and Land Use

Land use surrounding the site consists of residential, commercial and civic. Blyry Industrial Estate is located approximately 500m southeast of the site and Athlone town centre is located 2km to the southwest.

A Schools, Childcare and Social Infrastructure Assessment has been prepared for the Proposed Development by Genesis Planning Consultants which concluded that "*the existing school provision in the area is sufficient to cater for the needs of the current and future population of the area and the proposed development will be adequately catered for both in terms of schools, childcare and social infrastructure provision*". The Proposed Development benefits from close access to a wide range of existing social and community infrastructure in Athlone town.

12.3.4 Power Supply

12.3.4.1 Electricity Supply

EirGrid develop and operate the national electricity grid and are responsible for taking electricity from the power generators and delivering it to the distribution network, which is operated by ESB Networks. The high-voltage Irish electricity transmission grid comprises

6,800 km of power lines and operates at 400 kV, 220 kV and 110 kV. Substations provide entry points to, and exits from, the transmission grid.

Athlone 110kV substation is the closest substation to the Proposed Development and is located approximately 5km southwest (Eirgrid Group, Transmission System, March 2021). The closest 220 kV transmission system is Shannonbridge Power Station (also known as the West Offaly Power Station) situated approximately 20km southeast of the Proposed Development. The Shannonbridge power station closed in 2020 and planning permission has been granted for the replacement of the station with a battery energy storage system. The closest operational 220kV power station is Tynagh Power Plant located approximately 44km southwest of the Proposed Development (Figure 12-2).

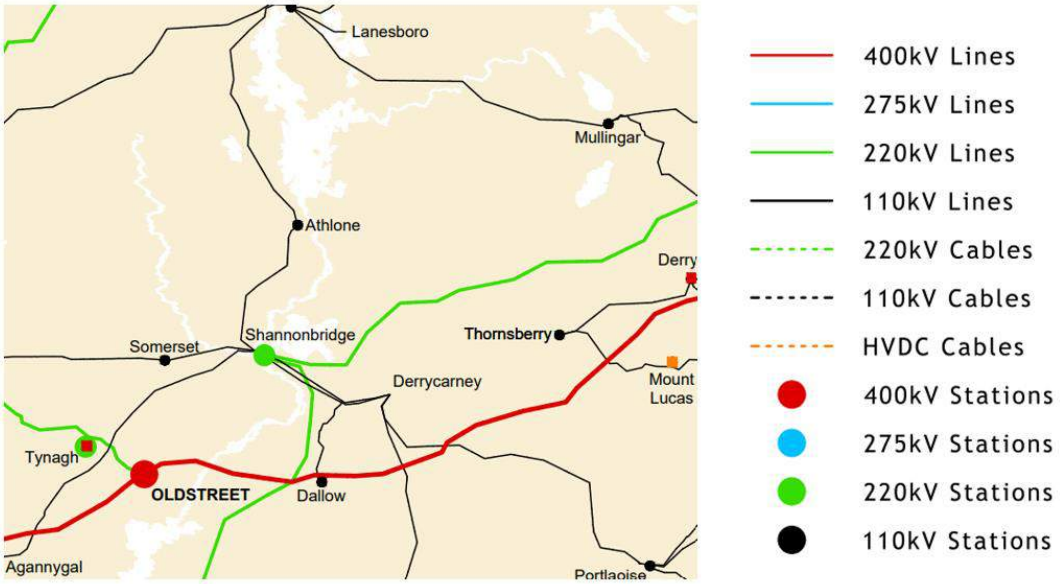


Figure 12-2 Power Supply surrounding the Proposed Development

12.3.4.2 Gas supply

Gas Networks Ireland builds, develops and operates Ireland's gas infrastructure, maintaining over 14,521 km of gas pipelines and two sub-sea interconnectors. Gas Networks Ireland is responsible for connecting all new gas customers to the network, and for work on service pipes and meters at customer's premises, on behalf of all gas suppliers in Ireland.

The Gas Networks Ireland map indicates that connections to the natural gas network are available in the Athlone area.

The site is currently greenfield and there is currently no onsite consumption or use of natural gas.

12.3.5 Information and Communications Technology (ICT)

In terms of mobile telecommunication for transmission and reception, the closest mobile communications mast is located at Dubarry Park approximately 1.1km west of the Proposed Development (Vodafone, Three, Meteor). The site is currently greenfield and IT infrastructure is not established or in place.

12.3.6 Local Hydrology and Hydrogeology

The Site is located within the Shannon (Upper)_SC_090 WFD Sub-catchment and with the Upper Shannon (Code: 26E) WFD Catchment. The Garrynafela Stream (EPA Segment Code: 26 1675) flows through the Site in an east to west direction, before being routed to the North along the western boundary of the Site. The Garrynafela Stream is within the Shannon Upper_110 WFD catchment (EU Code: IE_SH_26S021660). The Garrynafela Stream (which forms part of Shannon (Upper)_110) flows north into Ballaghkeeran Lake (EU Code: IE_SH_26_750d). Chapter 7 of this EIAR has detailed the local hydrology and hydrogeology.

12.3.7 On-site Surface Water Drainage

The Site is currently a greenfield site composed of agricultural fields and natural parkland coverage. As such, surface water currently infiltrates to ground and run-off discharges to the surrounding watercourses in line with the existing topography of the Site.

12.3.8 Water Supply and Demand

The site of the Proposed Development is greenfield and there is no water supply or demand at present. The site is currently not connected to a municipal water supply, but it is located in a well-serviced area.

12.3.9 Wastewater management

The Proposed Development Site is currently a greenfield site and there is currently no existing connection to a public sewer.

12.3.10 Waste Management

Westmeath County Council (WCC) is the local authority responsible for setting and administering waste management activities in the area of the Proposed Development. WCC's waste management activities are governed by the requirements set out in the Eastern Midlands Region Waste Management Plan (EMRWMP) 2015-2021. The EMRWMP is a statutory document prepared by the local authorities of the region. It covers the period from 2015 to 2021, after which time it will be revised or replaced. The Proposed Development Site is currently a greenfield site and has no waste management requirements.

12.4 Characteristics of the Proposed Development

The Proposed Development will consist of a 10-year permission for the provision of a total of 332 no. residential units along with provision of a crèche. Chapter 2 of this EIAR contains a detailed description of the development with a summary below.

(a) Site excavation works to facilitate the proposed development to include excavation and general site preparation works.

(b) The provision of a total of 172no. 2storey residential dwellings which will consisting of 152no. 3 bed units and 20no. 4 bed units.

(c) The provision of a total of 160no. apartments/duplex units consisting of 36no.1 bed units,
99no.2bed units and 25no. 3bed units. The apartment blocks range in height from 2 storey to 4 storey and the duplex blocks range from 2 storey to 3 storey in height.

(d) Provision of a 2 storey creche.

(e) Provision of associated car parking at surface level via a combination of in-curtilage parking for dwellings and via on-street parking for the creche, duplexes and apartment units.

(f) Provision of electric vehicle charge points with associated site infrastructure ducting to provide charge points for residents throughout the site.

(g) Provision of associated bicycle storage facilities at surface level throughout the site and bin storage facilities.

(h) The provision of a new link road via adjacent lands to the west to provide for vehicular, pedestrian and cyclist access.

(i) The provision of internal culverts and associated bridges along with a realignment of a section of an existing drainage channel within the site to facilitate internal access roads along with associated crossing points across the drainage channel (to facilitate pedestrian, cyclist and vehicular crossing points).

(j) The creation of a pedestrian footpath alongside the local road which will connect to the existing footpath aligning the N55 National road.

(k) Provision of associated open space areas, residential communal open space areas to include formal play areas along with all hard and soft landscape works for private gardens and amenity spaces along with public lighting, planting and boundary treatments to include boundary walls, railings and fencing.

(l) Provision of 2no. ESB substations.

(m) Internal site works and attenuation systems.

(n) All ancillary site development/construction works to facilitate foul, water and service networks for connection to the existing foul, water and ESB networks.

12.4.1 Construction Phase

The Proposed Development is to be delivered in 3 phases and over a period of 10 years. The Construction Phase will include all necessary site clearance and preparation work, site development and construction activities.

12.4.2 Operational Phase

The Operational Phase of the Proposed Development will consist of the normal day-to-day operations necessary for the management of residential dwellings and childcare facilities and the ongoing maintenance of these units along with the public and communal amenity space.

12.5 Potential Impact of the Proposed Development

This section assesses the potential impact of the Proposed Development on the Material Assets of the study area.

12.5.1 Power Supply

12.5.1.1 Construction Phase

Construction related activities will require temporary connection to the local electrical supply network. The Main Contractor will apply for a power supply from ESB Networks to power both the compound and the construction site. The size of supply will be calculated to ensure it is sufficient to power both the site compounds and construction site activities.

Connecting a new multi-unit housing development to the electricity distribution system must be carried out in accordance with ESB Networks specifications, and in particular with the guidance provided in the documents ESB Networks National Code of Practice for the Customer Interface Version 5 (2021) and ESB Networks Construction Standards for MV Substation Buildings (2019). The developer must undertake the preparatory work such as installation of ducting and provision of substation plinth or building. Once the preparation work has been completed to a satisfactory standard, ESB Networks will commence installation of the electricity cabling/lines and any other necessary equipment. A temporary suspension of the network locally to facilitate the connection works may be required during the Construction Phase, and an additional temporary suspension will also occur when power is provided to the Site of the Proposed Development. These temporary suspensions will be controlled by ESB Networks as the statutory undertaker and in accordance with standard protocols.

The potential impact from the Construction Phase of the Proposed Development on the local electrical supply network is likely to be slight, temporary and negative to neutral, depending on the length of temporary network suspensions.

12.5.1.2 Operational Phase

Electricity will be required to provide public lighting, domestic lighting, power supply and heating for each individual unit for the Proposed Development. Electric car charging facilities will be provided in the car park in line with Government policy. Two ESB Substations will be provided.

A Building Lifecycle Report (Balrath Engineering, 2023) has been prepared for the Operational Phase of the Proposed Development, which provides details on the mechanical and electrical services that will be installed at the Proposed Development. Low Energy Technologies Considered are listed in this report including:

- Charging Points;
- Exhaust Air Heat Pump;
- Central extract/demand-controlled ventilation; and
- Air Source Heat Pump.

The impact of the Operational Phase of the Proposed Development on the electricity supply network is likely to be to increase demand to the existing supply. The potential impact from the Operational Phase on the electricity supply network is likely to be neutral, long term and not significant.

12.5.2 Gas Supply

12.5.2.1 Construction Phase

There are no gas requirements during the Construction Phase and there will be no connections made to the natural gas network as part of the Proposed Development. As such, the potential impact from the Construction Phase on the gas supply network is likely to be permanently neutral and imperceptible.

12.5.2.2 Operational Phase

The Proposed Development will not be connected to the natural gas network. Heat Pumps (exhaust air heat pump and air source heat pump) powered by electricity will be used for space heating and domestic hot water during the Operational Phase. As such, the potential impact from the Operational Phase on the gas supply network is likely to be permanently neutral and imperceptible.

12.5.3 Information and Communications Technology (ICT)

12.5.3.1 Construction Phase

Connections may be required to the existing ICT network during the Construction Phase of the Proposed Development. New connections will be controlled by the network provider in accordance with standard protocols. Due to the temporary nature of the Construction Phase, the likely effect of the Construction Phase on the local telecoms network will be neutral, imperceptible, and temporary.

12.5.3.2 Operational Phase

The likely effect of the Operational Phase of the Proposed Development on the local telecommunications network is to be a marginal increase in demand. The Site of the Proposed Development is partially located within an area where high speed broadband is available and the closest mobile communications mast at Dubarry Park approximately 1.1km west of the Proposed Development (Vodafone, Three, Meteor).

The likely effect of the Operational Phase on the local telecoms network will be neutral, and imperceptible in the long term.

12.5.4 Surface Water Drainage

It is noted that specific issues relating to Hydrology, Hydrogeology and Surface Water associated with the Proposed Development are set out in Chapter 7 of this EIAR.

12.5.4.1 Construction Phase

There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the Construction Phase of the Proposed Development. The impact will therefore be ‘neutral’, ‘imperceptible’ and ‘temporary’.

12.5.4.2 Operational Phase

The Surface Water Drainage Strategy (SWDS) for the Site of the Proposed Development has been prepared by EOBMS Consulting Engineers Ltd (2023). Rainwater harvesting will be utilised on Site, collected rainwater will be used for care and upkeep of the lawns and gardens

which will infiltrate to ground and recharge. There will be some discharge to ground via SuDs (permeable paving and bio- retention areas) as well as rainfall which falls on unpaved areas.

Overall, the likely effect of the surface water drainage strategy for the Proposed Development will result in a neutral, imperceptible, long-term impact on receiving surface water quality.

12.5.5 Water Supply and Demand

It is noted that specific issues relating to Water associated with the Proposed Development are set out in Chapter 7 of this EIAR.

12.5.5.1 Construction Phase

Site offices and construction activities will create a demand for water supply to the site. A temporary connection is required to facilitate on-site works for all housing developments. Commencement of construction will therefore result in a net increase in the water demand for the Site of the Proposed Development.

The Proposed Development will be connected to the existing mains water supply subject to agreement from Irish Water who issued a Confirmation of Feasibility (CoF) for the connection on the 13th of November 2020 (refer to the separate standalone Planning Application Services Report). Within the CoF, Irish Water have confirmed that connection to the existing mains water supply network is feasible without any upgrades to the existing infrastructure.

New connection works may cause water supply disruptions during the Construction Phase. These disruptions will be controlled by Irish Water and Westmeath County Council in accordance with standard protocols. Due to the nature of the works during the Construction Phase, the likely effect will be negative, not significant and temporary.

12.5.5.2 Operational Phase

During the Operational Phase of the Proposed Development there will be a demand for water from the public water supply. The mains water supply is operated in accordance with relevant existing statutory consents. Proposed water demand has been calculated in the Planning Application Services Report for both the peak and average demand for houses and apartments (EOBMS Consulting Engineers Ltd., 2023).

Water supply to the Proposed Development will be provided by the existing Irish Water infrastructure by adding a new 150mm connection to the existing 150mm diameter watermain running along the N55. Confirmation of feasibility was received from Irish Water on the 13th of November 2020 (Ref; CDS200001202). The water connection is "*feasible without infrastructure upgrade by Irish Water*".

The likely effect of the increase in mains water demand will be neutral, not significant, and long-term on mains water supply.

12.5.6 Wastewater management

12.5.6.1 Construction Phase

A temporary connection is required to facilitate on-site works for all housing developments. Commencement of construction will therefore result in a net increase in the foul water produced at the Site of the Proposed Development. Foul water sewers will be constructed

strictly in accordance with Irish Water requirements. Confirmation of feasibility was received from Irish Water on the 13th of November 2020 (Ref; CDS200001202). The wastewater connection is 'Feasible without infrastructure upgrade by Irish Water'.

Due to the temporary and phased nature of the Construction Phase the likely effect of the Proposed Development on the existing foul water network during this phase is considered to be *negative*, *slight* and *temporary*.

12.5.6.2 Operational Phase

Foul water from the Proposed Development will be connect to the existing Irish Water Manhole to the northwest of the Site (refer to drawing 22-017-010- Drainage Layout). Foul water from the Site will be to mains sewer and discharge will be treated at the Athlone Wastewater Treatment Plan (WWTP) prior to discharge to the Shannon River. Confirmation of feasibility was received from Irish Water on the 13th of November 2020 (Ref; CDS200001202). The wastewater connection is 'Feasible without infrastructure upgrade by Irish Water'. All below ground drainage infrastructure will be constructed in accordance with Irish Water Code of Practice for Wastewater Infrastructure (Irish Water, 2020). Therefore, preventing any potential impact on the receiving groundwater as a result of leaking foul effluent to ground. This increase in wastewater being discharged to the public sewer will have a neutral and imperceptible impact.

12.5.7 Resource Management

12.5.7.1 Construction Phase

A Resource and Waste Management Plan (RWMP) was prepared by AWN Consulting which provides the information necessary to ensure that the management of Construction and Demolition (C&D) waste at the site.

The estimated construction and demolition waste generation for the Proposed Development based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m^2, using the waste breakdown rates shown in Table 12-7 (AWN Consulting, 2023).

Table 12-7 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	691.8	10	69.2	80	553.5	10	69.2
Timber	587.0	40	234.8	55	322.9	5	29.4
Plasterboard	209.6	30	62.9	60	125.8	10	21.0
Metals	167.7	5	8.4	90	150.9	5	8.4
Concrete	125.8	30	37.7	65	81.8	5	6.3
Other	104.8	20	21.0	60	62.9	20	21.0
Asphalts	12.9	0	0.0	25	3.2	75	9.7
Total	**1899.7**		**434.0**		**1300.9**		**164.8**

In addition to the waste described in Table 12-7, approximately 4,100m^3 of soil, stones, gravel and clay will be excavated to facilitate construction of new foundations and underground services. It is expected that all of the excavated material is to be reused on site (pending environmental soil testing).

Waste materials generated will be segregated on-site where practical and failing this, off-site segregation will be carried out. Skips and receptacles will be provided for segregation of waste on site and all waste receptacles leaving the site will be covered or enclosed. All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required. Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off-site for appropriate reuse, recycling, recovery and / or disposal. Dedicated bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required (AWN Consulting, 2023).

A member of the construction team will be appointed as the Resource Manager (RM) to ensure commitment, operational efficiency and accountability in relation to waste management during the construction phase of the Proposed Development. A waste training program will be organised by the RM for the training of site crew which will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

The Construction Phase of the Proposed Development will result in an increase in demand for waste collections and waste treatment in the area. Due to the nature of this phase, the impact will be *temporary*, *negative* and *moderate* in the absence of mitigation.

12.5.7.2 Operational Phase

An Operational Waste Management Plan (OWMP) has been prepared for the Proposed Development by AWN Consulting (2023). A waste generation model (WGM) developed by AWN Consulting has been used to predict waste types, weights and volumes arising from

operations within the proposed development. The WGM incorporates building area and use and combines these with other data including Irish and US EPA waste generation rates.

Wastes will be segregated based on waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible. The predicted waste types and volumes are presented in Table 12-8. Bin storage capacity has been calculated for the residential and creche units and appropriate waste storage receptacles will be provided by the facilities management company.

Table 12-8 Estimated Waste Generation for Residential Units and the Crèche

Waste Type	Waste Volume (m^3 / week)				
	1-bed unit (individual)	2-bed unit (individual)	3-bed unit (individual)	4-bed unit (individual)	Crèche
Organic Waste	0.01	0.02	0.02	0.02	0.04
DMR	0.08	0.12	0.14	0.17	1.61
Glass	<0.01	<0.01	<0.01	<0.01	0.01
MNR	0.04	0.06	0.07	0.09	0.88
Total	**0.13**	**0.20**	**0.23**	**0.28**	**2.54**

Blocks A, B and D have three shared Waste Storage Areas (WSA) located on the ground floor level in each respective apartment block. Block C, houses and duplex units have their own individual WSA. Residents with external access to the rear of the property will store waste in bins at the back of the unit. In units where external access to the rear of the property is unavailable, residents will store waste at the front or side of the unit, shielded from view of the road.

By implementing the actions outlined in the OWMP, a high level of recycling, reuse and recovery will be achieved at the development in line with European targets. The source segregation of waste types as detailed in the OWMP will also help to achieve the targets set out in the Eastern Midlands Region Waste Management Plan 2015-2021. Additionally, the design of the waste storage area will meet the requirements as detailed in the Department of Housing, Local Government and Heritage's 2021 publication, Sustainable Urban Housing, Design Standards for New Apartments. Adherence to the OWMP will also ensure that waste management at the development is carried out in accordance with the requirements outlined in the *WCC Waste Byelaws*.

In the absence of mitigation, the potential impact from the Operational Phase on municipal waste disposal is likely to be long term, negative and moderate. Provided the mitigation measures detailed in the RWMP and the OWMP (AWN Consulting, 2023) are implemented, and a high rate of reuse, recycling and recovery is achieved, the likely effect of the Construction and Operational Phases on the environment will be neutral and imperceptible in the long term.

12.5.8 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of

different effects that are individually minor. Such effects are not caused or controlled by the project developer.

Table 12-9 details the existing, proposed and granted planning permissions on record in the area which have been considered for potential cumulative impacts with the Proposed Development. The Proposed Development will increase the impact on the existing Material Assets. Having regard to other permitted developments in the area, which are either under construction or where construction has not yet commenced, there is potential for greater impact arising from the demand of additional population living in the area.

Table 12-9 Adjacent Permitted Planning Applications

Planning Ref No.	Applicant Name	Summary of Development
22253 Permission Granted: 26/10/2022	Marina Quarter Ltd	The development will consist of the following: Construction of 75 no. residential units comprising: 51 no. 2 storey semi-detached and terraced houses (consisting of 4 no. 2 bed houses and 47 no. 3 bed houses, ranging in size from c.78 sq.m – 120 sq.m each), and 24 no. 3 storey apartment/duplex units (consisting of 12 no. 2 bed apartments and 12 no. 3 bed duplexes, ranging in size from 84sq.m to 121 sq.m each), with associated private gardens and east/west facing terraces; All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Ref. 14/7103/ ABP Ref. PL25.244826 to the southeast of the site. All associated site development works, services provision, drainage works, residential open space (c.0.28ha) and public open space (c.0.82ha), landscaping, boundary treatment works, public lighting, 1 no. ESB substation cabinets, bin stores, car and bicycle parking provision; • Provision of a new detention basin on the eastern portion of the site designed to cater for the proposed development, in lieu of the drainage works permitted under WMCC Reg. Ref. 14/7103 / ABP Ref. PL 25.244826; This development will form part of a larger/future phase of the development. No changes to the existing pumping station located outside the northern site boundary.
22340 Decision Due Date: 04/02/2023	Marina Quarter Ltd	To consist of the following: 1) Construction of a two Storey childcare facility, including classrooms, reception, kitchen, associated staff areas and office, toilets, storage, plant rooms, circulation areas and photovoltaic panels at roof level (c.668sqm total gross floor area) 2) The proposed facility includes a secure outdoor play area (c. 595 sqm), 18 no. car parking spaces and 20 no. bicycle parking spaces. 3) Existing vehicular access onto the existing link road and provision of an internal access road, footpaths and 2 no. pedestrian access points. 4) All associated site development works, service provision, drainage works, landscape and boundary treatment works and public lighting. 5) This development will form part of a larger/future phase of the development. 6) A Natura Impact Statement has been prepared in respect of this planning application.
22577 Decision Due Date: 03/02/2022	Marina Quarter Limited	5-year permission for development at a site of total c.10.87 ha on lands located at Cornamaddy, Athlone, Co. Westmeath. The site is generally bounded to the west by greenfield lands and Cornamagh Cemetery, to the north by greenfield lands, to the south by greenfield lands and the Ballymahon Road (N55) and to the east by the existing Drumaconn housing

Planning Ref No.	Applicant Name	Summary of Development
		estate. The development will comprise of a residential development and public open space comprising the following: • Amendments to permitted application WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 for the removal of 38 no. permitted units (not constructed) to be replaced by: Construction of 70 no. residential units comprising: 4 no. 2 bed terraced houses (c.78 sq.m each), 60 no. 3 bed semidetached (c. 96-116 sq.m each) and 6 no. 4 bed semidetached houses (c. 147 sq.m each) with associated private gardens. • The creche facility, public open spaces, landscaping, roads layouts, car parking, boundary treatment works, public lighting and all associated site works associated with the 87 no. remaining units retained as permitted under WMCC Reg Ref. 14/7103 ABP Ref. PL25.244826 will remain unchanged. • All pedestrian and vehicular access roads and footpaths including a section of the planned east/west distributor road connecting to a section of the distributor road permitted under WMCC Reg. Refs 14/7103 ABP Ref. PL25.244826 and 22/253 to the east of the site. • All associated site development works, services provision, drainage works, public open space (c.1.03ha), landscaping, boundary treatment works, public lighting, associated ESB substation cabinets, bin stores, car and bicycle parking provision. • This development will form part of a larger/future phase of the development. • This planning application is accompanied by an Environmental Impact Assessment Report and Natura Impact Statement

The cumulative effects of Proposed Development on Material Assets have been assessed taking other planned, existing, and permitted developments in the surrounding area into account. Good construction management practices, as detailed in the CEMP, (EOBMS Consulting Engineers Ltd.) will minimise the risk of pollution and nuisance arising from construction activities at the Site. The works will be carried out in such a way that inconvenience to the public arising from increase in traffic flows and disruptive effects of construction traffic on local and main roads is limited wherever practical. Each of the developments that have been permitted in the vicinity of the site (detailed in Table 12-9) are subject to conditions, which, when considered in conjunction with the Proposed Development, it is predicted that the cumulative effects the Proposed Development on surface water, foul water disposal, potable water supply, natural gas supply, electrical supply, telecoms, and municipal waste will be negligible.

12.5.9 "Do Nothing" Impact

If the Proposed Development is not advanced, the site will remain as a greenfield site. A "Do-Nothing" scenario would result the lands remaining undeveloped, which would cause no significant adverse impact on the Material Assets in the surrounding area.

12.6 Avoidance, Remedial & Mitigation Measures

12.6.1 Construction Phase

Specific avoidance, remedial and mitigation measures to be taken during the Construction and Operational Phase with respect to water supply, surface water drainage and foul water are detailed within Chapter 7, Water (Hydrology and Hydrogeology), of this EIAR. All works will be carried out in accordance with the Construction and Environmental Management Plan prepared for he Proposed Development and the Irish Water Code of Practice for Water

Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). Laying of watermains/wastewater sewers and testing of pipelines and infrastructure will be in accordance with Irish Water standard details.

New connections for electricity and telecommunications will be coordinated with the relevant utility provider and Westmeath County Council and will be carried out and tested by approved contractors, as per standard protocols.

12.6.2 Operational Phase

An OWMP (AWN Consulting, 2023) has been produced for the Proposed Development which outlines measures to be taken to achieve waste prevention, maximum recycling and recovery of waste with a focus on diversion of waste from landfill wherever possible. Waste segregation will be implemented at the Proposed Development to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery. The Management Company will be responsible for the provision of a leaflet to all new tenants encouraging good waste segregation and pictorial information detailing the waste streams that can be placed in each bin. In addition to this, clauses that support waste segregation targets will be included in relevant legal documentation e.g., tenancy agreements where possible. The OWMP also states that the facilities management company must employ suitably permitted or licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

12.6.3 "Worst Case" Scenario

In the event that the Proposed Development was to proceed, a worst-case scenario in relation to built services & infrastructure (electricity, telecommunications, gas, water supply infrastructure, and sewerage), would be where the works involved during construction resulted in an extended power or telecommunications outage, or disruption to water supply or sewerage systems for existing properties in the area due to unforeseen delays on site.

A worst-case scenario in relation to waste would be where a previously unclassified hazardous waste stream arose on the site during excavations, which was not identified and segregated appropriately and resulted in the contamination of a non-hazardous waste stream, such as soil and stones, resulting in a large volume of hazardous waste that would require specialist removal and treatment. Additionally, the contaminated soil and stones would no longer be fit for use for fill and landscaping and would need to be replaced with imported materials.

However, taking account of the avoidance and mitigation measures, the worst-case scenarios are deemed to be an unlikely scenario.

12.7 Residual Impacts

Residual impacts are defined as "*effects that are predicted to remain after all assessments and mitigation measures*". They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, no significant residual impacts are anticipated.

12.8 Monitoring

12.8.1 Construction Phase

The monitoring of C&D waste during the Construction Phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the site boundary. The Resource and Waste Manger will be responsible for monitoring and record keeping in respect of waste leaving the facility and ensuring that these records will be maintained on site.

12.8.2 Operational Phase

The building management company, residents, tenants and creche operators will be required to maintain the bins and storage areas in good condition as required by the Westmeath Waste Bye-Laws. The waste strategy presented in the OWMP will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

12.9 Interactions

Material Assets - Utilities and Waste interact with other environmental receptors as follows.

12.9.1 Population and Human Health

In the absence of mitigation, the improper removal, handling and storage of waste could negatively impact on the health of construction workers. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health. Chapter 4 (Population and Human Health) of this EIAR has concluded that no long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.

12.9.2 Biodiversity

The improper handling and storage of waste during the Construction and Operational Phases could negatively impact on biodiversity. Potential impacts on biodiversity are addressed in Chapter 5 (Biodiversity).

12.9.3 Land and Soil

Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the site. Potential impacts on land and soils are addressed in Chapter 6.

12.9.4 Hydrology and Hydrogeology

All connections to the public water network (water supply or foul sewer), abstractions from water supply and discharges to the foul sewer during the Construction and Operational Phases will be under consent from Irish Water. An assessment of the potential impact of the Proposed Development on Water are addressed in Chapter 7 (Hydrology & Hydrogeology) of this EIAR.

Chapter 7 has concluded that there are no likely significant adverse impacts on hydrology and hydrogeology anticipated regarding this Proposed Development.

12.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter.

12.11 References

Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021

Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

EPA (2021) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements.

ESB Networks (2021) National Code of Practice for the Customer Interface Version 5

ESB Networks (2019) Construction Standards for MV Substation Buildings

European Union (Waste Directive) Regulations 2011-2021

Health and Safety Authority (2010) Code of Practice for Avoiding Danger from Underground Services

https://siteviewer.comreg.ie/#site/1318/53.3334867275/-6.2920326981/1/Site%201318 viewed online 26.07.2022

https://www.gov.ie/en/publication/5634d-national-broadband-plan-map/#interactive-map viewed online 26.07.2022

http://mywaste.ie viewed online 26.07.2022

https://epawebapp.epa.ie/terminalfour/waste/index.jsp viewed online 26.07.2022

http://www.nwcpo.ie/permitsearch.aspx viewed online 26.07.2022

Irish Water Code of Practice for Water Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2)

Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851.

Waste Management Acts 1996 to 2011

Water Services Acts 2007 to 2017

13 RISK MANAGEMENT

13.1 Introduction

This chapter of the EIAR sets out the assessment of the vulnerability of the Proposed Development to risks of major accidents and/or disasters. It assesses the expected effects of the project to risk of major accidents and disasters relevant to the project. It includes the methodology used for the assessment. The Interactions and Mitigation and Monitoring Measures are included in Chapters 14 and 15, respectively.

13.1.1 Quality Assurance and Competence

This Chapter was prepared by Louise Hewitt, Environmental Consultants, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports and EIAR Chapters for projects of a similar nature and scale.

13.2 Study Methodology

13.2.1 Scope and Context

The relevant legislation that applies to this Chapter is the Planning and Development Regulations 2001 – 2022, as amended, and in particular Schedule 6 – Information to be contained in EIAR. The following paragraph of Schedule 6, Paragraph 2(e)(i)(IV), specifically refers to "*a description of the likely significant effects on the environment of the proposed development resulting from … the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)*".

Paragraph 2(h) further expands with "*a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events*."

Additionally, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the “COMAH Regulations”), which implement the Seveso III Directive (2012/18/EU), and which revoked the 2006 Major Accident Regulations also applies to this Chapter.

13.2.2 Guidelines and Reference Material

Cognisance has been taken of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022). This document follows the requirements laid out in the Directive 2014/52/EU.

Specifically, the EPA Guidelines state that the EIAR must take account of "*the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk)… The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g., the potential effects of floods on sites with sensitive plants. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required. The EIAR should refer to those separate assessments while avoiding duplication of their contents*."

Reference has also been made to the Department of the Environment, Heritage & Local Government (DoEHLG) Publication 'Guide to Risk Assessment in Major Emergency Management 2010' and the Office of Emergency Planning, Department of Defence (DOD) Publication 'A National Risk Assessment for Ireland 2020'. A consolidated list of national hazards for Ireland identified in the DOD document are identified in Table 13-1.

Table 13-1 Consolidated List of National Hazards (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

Hazard: Civil	**Hazard: Natural**
• Large Crowd Event • Pandemic • Water Supply Distribution and Contamination • Food Chain Contamination • Animal Disease • Terrorist Incident	• Storm • Snow and Ice (including pro-longed low temperature) • Flooding (including pluvial, fluvial and coastal)
Hazard: Transportation	**Hazard: Technological**
• Maritime Incident • Air Incident • Transport Hub (including Airports, Ports and Rail Stations)	• Structural Collapse (including Dam, Tunnel, Bridge and Building) • Nuclear Incident (Abroad) • Cyber Incident • Disruption of Energy Supply (including oil, gas, electricity and communications)

13.2.3 Risk Assessment Methodology

The risk assessment methodology has been supported by general risk assessment methods. Hazard analysis and risk assessment are accepted internationally as essential steps in the process of identifying the challenges that may have to be addressed by society, particularly in the context of emergency management. Mitigation as a risk treatment process involves

reducing or eliminating the likelihood and/or the impact of an identified hazard (DoEHLG, 2010).

Table 13-2: Classification of National Likelihood Criteria (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

National Likelihood Criteria		
Rating	**Classification**	**Average Recurrence Interval**
1	Extremely Unlikely	500 or more years between occurrences
2	Very Unlikely	100-500 year between occurrences
3	Unlikely	10-100 years between occurrences
4	Likely	1-10 years between occurrences
5	Very Likely	Less than 1 year between occurrences

13.3 Predicted Impacts

The EIAR chapters within this report identify that the Proposed Development has been designed in accordance with best practice and that the Proposed Development can be safely undertaken without risk to health.

In order to understand the potential consequences and predicted impacts of any major accident or disaster due to the Proposed Development and the vulnerability of the project a desk study was undertaken. The assessment reviewed:

- The vulnerability of the project to major accidents or disasters.
- The potential for the project to cause risks to human health, cultural heritage and the environment, as a result of that identified vulnerability.

A methodology has been used including the following phases:

Phase 1 Assessment:

The DOD Consolidated List of National Hazards was used to identify a preliminary list of potential major accident and disasters. Receptors covered by legislation were not included within the assessment e.g., construction workers.

Phase 2 Screening:

The list was screened and major events such as volcanoes were not included given the unlikely event of one occurring. Elements already addressed as a key part of the design e.g. risks of building collapse, are not repeated.

Phase 3: Mitigation and Evaluation

In the event that mitigation measures included did not mitigate against the risk, then, the potential impacts on receptors are identified in the relevant chapter. Table 13-3 lists the major accidents and/or disasters reviewed.

Table 13-3: Major Accidents and/or Disasters Reviewed

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Civil				
Large Crowd Event (An event with over 5,000 people)	N	Not considered vulnerable due to the nature of the Proposed Development, i.e., residential development with 172 no. units.	N/A	N/A
Pandemic	Y	All workers directly and indirectly employed during the Construction and Operational Phase of the Proposed Development will comply with the relevant Government protocols that will be in place at that point in time in relation to COVID-19.	Local businesses, construction workers, operational phase employees.	Chapter 4 (Population and Human Health) of this report addresses the Pandemic.
Water Supply Contamination	N	Waterborne diseases can be caused by consuming contaminated drinking water. No public health issues have been identified for the Construction Phase or Operational Phase of the Proposed Development.	Local water users	Chapter 7 (Hydrology) of this report identifies the control measure required to avoid contamination of water supplies during construction and operational works.
Food Chain Contamination	N	Not considered vulnerable	N/A	N/A
Animal Disease	N	Not considered vulnerable	N/A	N/A
Terrorist Incident	N	Not considered vulnerable	N/A	N/A
Transportation				
Maritime Incident	N	Not considered vulnerable. The closest port is Dublin Port which is located approximately 113km east of the Site.	N/A	N/A
Air Incident	N	Not considered vulnerable. The closest airport is Ireland West Airport Knock which is located approximately 80km northwest of the Site. Dublin Airport is located approximately 109km east of the Site.	N/A	Public Safety Zones for Dublin Airport are assessed in Section 13.4 of this chapter.

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Transport Hub (Includes Airports, Ports and Rail Stations)		Not considered vulnerable. The proposed Site is not considered a transport hub.	N/A	N/A
Natural				
Cultural, Archaeological and Architectural Heritage	Y	The site is a previously undeveloped greenfield site. There is potential for sub-surface archaeological remains to be discovered during earthworks and topsoil stripping.	Cultural Heritage	Chapter 11 (Archaeology and Cultural Heritage) of this EIAR assesses impact of the Proposed Development on the Archaeological and Cultural Heritage and proposes mitigation measures where required.
Landslides	N	The Proposed Development Site is located within an area of "Low" and "Inferred Low" Landslide susceptibility classification (GSI, 2022). There is no recorded landslide within a 2km radius of the Proposed Development Site.	N/A	Chapter 6 (Land and Soils) of this EIAR assessed the vulnerability of the Proposed Development to landslides
Earthquakes	N	Area is not geologically active. N/A N/A	Area is not geologically active. N/A N/A	Area is not geologically active. N/A N/A
Floods/ Storm surge/tidal flooding	N	The Proposed Development Site is located within Flood Zone C where the probability of flood from river and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding"	Residents/ workers/members of the public	Chapter 7 (Hydrology) of this EIAR and the Site-Specific Flood Risk Assessment (EOBMS, 2022) identifies the vulnerability of the project to flooding.
Severe weather such as storms, blizzards, droughts, tornados, heatwaves	N	Not considered vulnerable. In the event of severe weather events, the national meteorological service, Met Éireann, provides advance notice of severe weather, usually several days in advance. When appropriate, colour-coded weather warnings are issued. The Office of Emergency Planning works with the government departments and other key public authorities in order to ensure the best possible use of resources and compatibility across different emergency planning requirements.	N/A	N/A

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Air Quality events	Y	Dust emissions during the construction phase and vehicular emissions during the construction and operational phase.	Residents/ workers	Chapter 8 (Air Quality and Climate) of this EIAR identifies the impact of the construction and operation of the development on ambient air quality.
Wildfires	N	Not considered vulnerable due to the location of the Site of the Proposed Development.	N/A	N/A
Fire	N	The risk of fire might lead to loss of life.	Residents, service users, members of the public and nearby properties.	Section 13.4.1 of this chapter details fire prevention measures.
Invasive species	N	Species records from the NBDC online database were studied for the presence of invasive plant species. One invasive species is listed for the 2km grid square N04R, "High" impact species, Japanese knotweed was recorded in 2019. However Japanese knotweed was not identified on Site during surveys.	Native species / local biodiversity	Chapter 5 (Biodiversity) identifies the vulnerability of the project to invasive species and details measures to avoid the introduction or dissemination of invasive species to and from the Site of the Proposed Development.
Technological				
Structural Collapse (Building)	N	This will be taken into consideration in the building design. All buildings will be designed to modern standards. No further assessment is required.	N/A	The design criteria of the buildings will be in accordance with all relevant building design standards.
Structural Collapse (Dam, Bridge, Tunnel)	N	Not considered vulnerable as no dams, bridges or tunnels are proposed as part of the development.	N/A	N/A
Flood defence failure	N	Appropriate drainage design, SuDS and attenuation design, have all been included in the design of the Proposed Development and will be installed according to appropriate regulations and guidelines.	Residents, service users, members of the public and nearby properties.	Chapter 7 (Hydrology) of this EIAR and the Site-Specific Flood Risk Assessment (EOBMS, 2022) identifies the vulnerability of the project to flooding.
Nuclear incident	N	Not considered vulnerable.	N/A	

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Cyber incident	N	Not considered vulnerable.	N/A	N/A
Disruption of energy supply (oil, gas, electricity)	N	Not considered vulnerable. ESB Networks maintain the electricity network in Ireland. Gas Networks Ireland maintain the natural gas network in Ireland.	N/A	Chapter 12 (Material Assets) contains information on energy supply.
Utilities failure (communications)	N	Not considered vulnerable. In Ireland, the fixed-line communications market is dominated by Eir; while Eir, Three, and Vodafone own Ireland's mobile telecommunications infrastructure.	N/A	Chapter 12 (Material Assets) contains information on telecommunications.
Utilities failure (water supply)	N	Not considered vulnerable	N/A	Chapter 7 (Hydrology) and Chapter 12 (Material Assets) of this EIAR contain information on water supply
Utilities failure (wastewater, sewage)	N	Not considered vulnerable	N/A	Chapter 7 (Hydrology) and Chapter 12 (Material Assets) of this EIAR contain information on wastewater and sewage removal and treatment
Utilities failure (solid waste)	N	Not considered vulnerable	N/A	Chapter 12 (Material Assets) of this EIAR contains information on solid waste removal and treatment
Industrial accidents (defence, energy, oil and gas refinery, food industry, chemical industry, manufacturing, quarrying, mining)	N	There are no Upper Tier Seveso sites located near the Proposed Development. The closest is Synergy Health Ireland is located approximately 30km southeast of the Site.	N/A	N/A

13.4 Management Plans

13.4.1 Fire Safety and Emergency Response Plan

The design criteria of the buildings are in accordance with all relevant building and fire safety standards. Fire alarms, fire extinguishers and fire blankets will be installed in all internal areas. All fire alarms will be in accordance with the current IS3218:2013 + A1 2019 and the Fire Certificate, and all fire extinguishers will meet the requirements of I.S 291:2015 – Selection, Commissioning, Installation, Inspection and Maintenance of Portable Fire Extinguishers.

A fire evacuation strategy will be put in place in advance of dwelling occupancy. Appropriate means of escape in case of fire involving multiple escape stairs, ventilated corridors and sprinkler systems have been designed into each of the apartment blocks and the creche. Fire safety checks and fire drills will be employed by the Management Company once the Proposed Development is operational. Access routes serving the Proposed Development have been designed to provide adequate space for the Fire Brigade.

In relation to water supply for firefighting purposes, hydrants will be screw down type to BS 750 with 80mm diameter flanged inlet and 63 mm male thread outlet. The outlet from the hydrant shall not be greater than 200mm below adjoining ground level. Indicator plates conforming to BS 3251 shall be fixed to nearby walls or concrete marker posts. Each hydrant will comply with fire service requirements, but, as a minimum will be capable of delivering 500 litres per minute at each hydrant.

13.4.2 Public Safety Zone

Public Safety Zones (PSZs) are mapped out around airport runways to protect the public on the ground from possible aircraft crashes in populated area. PSZs are used to prevent inappropriate use of land where the risk to the public is greatest, e.g., by limiting the type and allowable height of buildings and structures within the zones.

The Department of Transport has not published information on the PSZs relating to the nearest airport, Ireland West Airport Knock. The Ireland West Airport Knock Local Area Plan 2012-2018 produced by Mayo County Council states the following in relation to the PSZs surrounding the airport.

> *"The Inner PSZ extends a maximum of 1325m from the runway thresholds and is never more than 96 metres wide. The Outer PSZ extend a maximum of 5647m from the runway thresholds and is never more that 261m wide"*

Considering the Proposed Development is located approximately 80km southeast of the Ireland West Airport Knock and well outside the PSZs, an aircraft strike disaster is not considered relevant to this Proposed Development.

The Site of the Proposed Development is located approximately 109km west of Dublin Airport. There are no PSZs directly over the Site of the Proposed Development. Based on the distance of the Proposed Development from Dublin Airport and the PSZs, an aircraft strike disaster is not considered relevant to this Proposed Development.

13.4.3 Potential Major Emergency Management Sites and Seveso Sites

The Site is located in the Garda Division of Westmeath / Meath. The Site is not located in close proximity to any Upper or Lower Tier Seveso Sites. The following Upper Tier Seveso Sites are located within 50km of the Proposed Development.

- Synergy Health Ireland is located approximately 30km southeast of the Site.
- Ecolab Ireland is located approximately 36km northeast of the Site.
- Tynagh Energy Ltd. (also referred to as Tynagh Power Plant) is located approximately 45km southwest of the Site.

Based on the distance of the Proposed Development from any Seveso Sites the risk of a potential major emergency is not considered relevant to this Proposed Development.

Figure 13-1 Seveso Sites located within 50km of the Proposed Development (Site location marked in yellow) (Seveso Site Locations, GardaMappingSection, 2023)

13.4.4 Flood Risk Assessment

A Site-Specific Flood Risk Assessment was carried out by EOB Management Services which states the Proposed Development Site is located within Flood Zone C "*where the probability of flood from river and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding*". The Proposed Development is therefore not at risk from flooding.

13.4.5 Tree Protection measures

An Arboricultural Impact Assessment was carried out by Charles McCorkell which includes a Tree Protection Plan (Appendix A, 220530-P-12). A large quantity of the treelines on Site are proposed for retention and protection. All treelines within the Site being retained will be protected using robust fencing throughout the Construction Phase as per the Tree Protection Plan. The protective fencing will remain in situ for the duration of the project and will only be removed upon completion of all works. Construction will only commence once the protective barriers and/or ground protection have been erected.

13.4.6 Spill Control Measures

The Proposed Development will involve the use of machinery during the construction phase. Such machinery is powered by diesel engines and operate using hydraulics. Unless carefully managed such plant and machinery have the potential to leak hydraulic oils or cause fuel leaks. Fuel, oils and chemicals used during construction are classified as hazardous. All fuels/soil and all storage tanks and draw-off points will be located in a dedicated, bunded and secure area of the Site. Chapter 6 Land and Soils and Chapter 7 Hydrology have assessed the potential for spillages during the phases of the Proposed Development. Only small volumes of fuel/oils will be present on-site and therefore no significant effects are expected. Procedures and contingency plans will be set up to deal with emergency accidents and spills and an emergency spill kit with oil boom, absorbers etc. will be kept on site for use in the event of an accidental spillage.

13.5 Residual Impacts

Control measures will put in place for health and safety and environmental management as per conditions of the planning permission, relevant code of practices and relevant legislation. The residual impacts will be negligible once all control, mitigation and monitoring measures have been implemented. The potential for dust or noise from the Site operations to cause any nuisance to nearby receptors is deemed to be negligible and the adherence and full implementation of the appropriate control and mitigation measures will ensure there is no potential for cumulative impacts to arise.

13.6 Monitoring

There is no monitoring required with regards to risk management. All monitoring proposals for the interacting chapters have been detailed in the relevant technical chapters and are included in Chapter 15 Mitigation Measures and Monitoring.

13.7 Difficulties Encountered When Compiling

No difficulties were encountered in completing this Risk Chapter.

13.8 References

Chapters 4-12 of Volume 2 of this EIAR

Environmental Resources Management Ireland Ltd (2005) Public Safety Zones Report

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

Garda Mapping Section – Seveso Sites Ireland WebMap https://www.arcgis.com/home/item.html?id=a01b5a0a6ff24f10adff30beaa3b6fd0

Irish Water Greater Dublin Area water restrictions chart https://www.water.ie/help/supply/water-shortages/

Office of Emergency Planning (2020) 'A National Risk Assessment for Ireland 2020' Department of Defence Publication

Statutory Instrument (SI). No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018

Mayo County Council (2012) Ireland West Airport Knock Local Area Plan 2012-2018

14 INTERACTIONS

14.1 Introduction

As a requirement of Planning Regulations and the Environmental Protection Agency's '*Guidelines on information to be contained in Environmental Impact Assessment Reports*' (2017), interrelationships between various environmental aspects must be considered when assessing the impact of the Proposed Development, as well as individual significant impacts. The significant impacts of the Proposed Development and the proposed mitigation measures have been detailed in the relevant chapters of this report. However, as with all developments that pose potential environmental impacts, there also exists potential for interactions/interrelationships between the impacts of different environmental aspects. The results may exacerbate or ameliorate the magnitude of impacts. This chapter of the EIAR addresses the interactions between the various environmental factors of the Proposed Development.

The following Section is directed by Article 3 section 1(e) of the EIA Directive. The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft, 2017) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015) were also considered.

Article 3 of the Directive states:

1. 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).

14.2 Study Methodology

The interactions between impacts on different environmental factors have been addressed throughout this EIAR. Close co-ordination and management with the EIAR team was carried out to ensure that all likely relevant interactions were addressed at the scoping stage of the EIAR, and interactions have been adequately assessed.

Following an assessment of the EIAR, a matrix was produced to display where interactions between impacts on different factors have been addressed. This has been carried out by use of chapter headings included in the EIAR and details of any interaction during all phases of the Proposed Development.

14.3 Interactions

The following matrix has been produced to show where potential significant interactions between effects on different factors have been addressed, see Table 14-1.

As this EIAR has been prepared by a number of specialist consultants, an important aspect of the EIA process was to ensure that interactions between the various disciplines have been

taken into consideration. The principal interactions requiring information exchange between the environmental specialists and the design team are summarised below in Table 14-2 to Table 14-10.

Table 14-1: Interactions between Factors

Interaction	4. Population and Human Health	5. Biodiversity	6. Land and Soils	7. Hydrology	8. Air Quality & Climate	9. Noise & Vibration	10. Landscape & Visual Amenity	11. Archaeology, Architecture & Cultural Heritage	12. Material Assets – Traffic, Waste & Utilities
Population and Human Health									
Biodiversity									
Land and Soils									
Hydrology									
Air Quality and Climate									
Noise & Vibration									
Landscape & Visual Amenity									
Archaeology, Architectural and Cultural Heritage									
Material Assets – Waste & Utilities									
Material Assets - Traffic									

	No Interaction
	Interaction
	N/A

Table 14-2 Population and Human Health

Population and Human Health	
Summary	
Chapter 4 of this EIAR, *Population and Human Health,* details the direct and indirect effects of the Proposed Development on Population and Human Health; and sets out any required mitigation measures where appropriate. Construction Phase: The Proposed Development has the potential to cause dust nuisances during the Construction Phase as well as noise and vibrations from plant machinery and traffic.	
Interactions	
Hydrology	Pollution events can impact the water quality and thus impact the human health of the surrounding population. Appropriate surface water control measures will be implemented as part of the Proposed Development. No public health issues associated with the water conditions at the Site have been identified for the Construction Phase or Operational Phase of the Proposed Development. There are no likely significant adverse impacts as a result of Hydrology and as such there will be no significant impacts on population and human health. Hydrology has been fully assessed in Chapter 7 of this EIAR.
Air Quality and Climate	Interactions with air quality during the construction and operational phase has the potential to cause issues relating to dust and traffic emissions impacting human health. However, Chapter 8 has concluded that there will be no significant air quality impacts. All ambient air quality legislative limits will be complied with and therefore the predicted impact is not significant with a neutral effect on human health. Air quality is discussed further in Chapter 8 of this EIAR.
Material Assets: Traffic	Construction activities will result in an increased number of HGV movements. During the operational phase there will be an increase in the population of the area and thus an increase in the number of road users. There is a potential impact on population and human health in relation to the capacity and operation of the surrounding road network. The existing N55 / R916 / L8048 roundabout will continue to operate within capacity with small queues and delays when the proposed residential development and the future residential developments adjacent to the development are complete in 2042, fifteen years after opening and subsequently there will be no significant impact on population and human health.

Noise and Vibration	Construction activities such as site clearance, building construction works, and trucks and vehicles entering and exiting the Site have the potential to interact with the surrounding population and human health and cause noise disturbance. The impact assessment of noise and vibration has concluded that additional noise associated with the construction and operational phase will not cause a significant negative impact. Operational Phase noise impacts have also been assessed in relation to traffic and plant equipment and no significant negative impacts will be experienced. As such, there will be no significant impact on population and human health. Noise is assessed in further detail in Chapter 9 of this EIAR.
Landscape and Visual	The Proposed Development will alter the visual appearance of the site which is predominantly a greenfield site. It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the zoning of the Site of the Proposed Development and the residential nature of the surrounding landscape, will cause any significant impacts and as such there will be no significant impact on population and human health.
Conclusions	
Adverse impacts on Air Quality, Noise and Vibration and Traffic are not expected to occur and mitigation measures have been set out for any of these potential interactions. The Proposed Development is also considered to not have any interactions with Hydrology or Landscape and Visual.	

Table 14-3: Biodiversity

Biodiversity	
Summary	
Chapter 5 of this EIAR, *Biodiversity,* details the direct and indirect effects of the Proposed Development on the local flora and fauna; and sets out any required mitigation measures where appropriate. Construction Phase: • There is potential impact on receiving waterbodies, ecology and biodiversity in the vicinity of the Site during the Construction Phase of the Proposed Development. Appropriate mitigation and monitoring methods have been established. Operational Phase: • The landscaping plans include losses and contributions in terms of vegetation at the Site, which in turn will affect the ecology of the Site	
Interactions	
Land and Soil	An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment; with emphasis on the impact of the Proposed Development on the receiving soils underlying the Site during the Operational Phases of the Proposed Development, is described in Chapter 6 - 'Land and Soil' of this EIAR. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are described in full in Chapter 6. The bulk removal of soils, sands and gravel at the Site can have implications for biodiversity. Natural regeneration of native and local seeds is the preferred option for re-vegetating areas to be retained for biodiversity.
Hydrology	The key environmental interaction with biodiversity is water. An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is described in Chapter 7 - 'Hydrology' of this report as well as in his Chapter, to ensure the quality (pollution and sedimentation) and quantity (surface water run-off) of water is of appropriate standard. Interactions between hydrology and biodiversity can occur through impacts to water quality, arising, for example from an accidental pollution event during the Construction and Operational Phase. This interaction has the potential to result in impacts on habitats and

	fauna that are hydrologically linked to the Site via the Garrynafela Stream.
Material Assets	Construction waste arising from Site operations could negatively affect local fauna through entrapment, for example. However, appropriate waste management practices on Site will ensure no significant effects occur on local biodiversity.
Air Quality and Climate	An assessment of the potential impact of the Proposed Development on air quality and climate is included in Chapter 8 of this EIAR. Dust emissions arising from the Construction Phase of the Proposed Development were identified as having potential impacts on local biodiversity. Once dust minimisation measures are implemented, impacts to biodiversity are not predicted to be significant.
Landscape and Visual Assessment	An assessment of the potential impacts of the Proposed Development on the surrounding landscape character is outlined in Chapter 10 – Landscape and Visual. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 10. Landscaping at a development site can have significant implications for biodiversity. The landscape plan for the Proposed Development includes an area to be retained for biodiversity. The lighting plan for the Site has also been sensitively designed to protect bats from light pollution. Significant negative effects are not predicted.
Conclusions	
Appropriate Mitigation and Monitoring methods have been established to mitigate risk of impacts to Biodiversity and the surrounding environment during both the Construction and Operational Phases of the Proposed Development.	

Table 14-4: Land and Soils

Land and Soil	
Summary	
Chapter 6 of this EIAR, *Land and Soil*, details the direct and indirect effects of the Proposed Development on the local land, soils, and geology; and sets out any required mitigation measures where appropriate. Construction Phase: • There is the potential for adverse impacts for Air Quality through the excavation of soils at the Proposed Development Site. This is addressed in Chapter 8.	
Interactions	
Population and Human Health	The Proposed Development is not considered to be within a High Radon Area and where required radon barriers will be installed in accordance with current building regulations. The potential for ingress of ground gases including radon or gases associated with organic content of soil will be addressed through standard building design measures including the installation of appropriate membranes. Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase that will be protective of Site workers. The necessary measures will also be implemented to address any nuisance issues associated with dust dispersion during construction works including the offsite removal of surplus soil. The potential impacts associated with airborne dust is addressed in Chapter 8 (Air Quality) and Chapter 4 (Population and Human Health) of this EIAR. Specific issues relating to Public Heath associated with the Proposed Development are set out in Chapter 4 of this EIAR.
Hydrology	An assessment of the potential impact of the Proposed Development on the hydrological environment is included in Chapter 7 of this EIAR. Procedures for the protection of receiving surface water environment are set out in Chapter 7 of this EIAR.
Material Assets	The Proposed Development will include the removal offsite of surplus soils and stone for reuse/recovery/disposal. An assessment of the potential impact of the Proposed Development on the material assets including built services, infrastructure ad waste management is included in Chapter 12 of this EIAR.

Biodiversity	An assessment of the potential impacts of the Proposed Development on the Biodiversity, with emphasis on habitats, flora and fauna which may be impacted as a result of the Proposed Development are included in Chapter 5 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.
Landscape and Visual	During the construction phase the site landscape will undergo a change from predominately greenfield lands to residential with landscaping. An assessment of the potential impact of the Proposed Development on the receiving land scape is included in Chapter 10 of this EIAR.
Air Quality and Climate	The excavation of soils across the Proposed Development Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust). An assessment of the potential impact of the Proposed Development on air quality and climate are included in Chapter 8 of this EIAR.
Conclusions	
The Operational Phase of the Proposed Development has the potential to have adverse impacts on Air Quality, Biodiversity, Hydrology and Population and Human Health through dust and air pollution. However, appropriate Mitigation and Monitoring methods have been established in the respective Chapters.	

Table 14-5: Hydrology and Hydrogeology

Hydrology and Hydrogeology	
Summary	
Chapter 7 of this EIAR, *Hydrology and Hydrogeology*, provides an assessment of the potential impacts of the Proposed Development on hydrology, water and hydrogeology and sets out any required mitigation measures where appropriate. There is a potential risk of adverse impacts in the form of pollution for Biodiversity and Land, Soil and Geology. Additionally, there are potential health and safety risks associated with the Operational Phase of the Proposed Development. During the Construction Phase industry standard and health and safety legislative requirements will be implemented for the protection of site workers and Population and Human Health. Each respective Chapter outlines appropriate industry standard and health and safety standards as well as Mitigation and Monitoring measures will ensure that there are no significant impacts.	
Interactions	
Population and Human Health	No public health issues associated with the water (hydrology and hydrogeology) conditions at the Proposed Development Site have been identified for the Construction Phase or Operational Phase of the Proposed Development. It is noted that specific issues relating to Public Heath associated with the Proposed Development are set out in Chapter 4 of this EIAR.
Land, Soils and Geology	An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment during the Operational Phase of the Proposed Development is set out in Chapter 6 Land, Soil and Geology.
Material Assets: Waste and Utilities	An assessment of the potential impact of the Proposed Development on the Material Assets including built services, infrastructure, traffic, and waste management has been set out in Chapter 12 of this EIAR. Any discharges to the public foul sewer and water supply to the Proposed Development will be under consent from Irish Water.
Biodiversity	An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Proposed Development Site, with emphasis on habitats, flora and fauna which may be impacted as a result of the Proposed Development is included in Chapter 5 of this EIAR. It also assesses the impacts of the Proposed Development on habitats and species, particularly those protected

	by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

Conclusions

Mitigation and Monitoring measures have been established for the protection of Land, Soil and Geology and Biodiversity the Operational Phases of the Proposed Development.

Population and Human Health is protected by the appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase that will be protective of site workers.

There are no adverse interactions expected for as a result of the Proposed Development.

Table 14-6: Air Quality and Climate

Air Quality and Climate	
Summary	
Chapter 8 of this EIAR, *Air Quality and Climate*, provides an assessment of the potential impacts of the Proposed Development on ambient air quality and climate, and sets out appropriate mitigation measures where necessary. Dust nuisances were the primary pollutant during the Construction Phase of the Proposed Development. The greatest potential effect on air quality during the Operational Phase of the Proposed Development is from traffic-related air emissions. However, these are not expected to have a significant impact on population and human health.	
Interactions	
Population and Human Health	Interactions between Air Quality and Population and Human Health have been considered as the Proposed Development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the Proposed Development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as negligible, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.
Biodiversity	Interactions between Air Quality and Biodiversity have been considered as the Construction Phase has the potential to interact with flora and fauna in adjacent habitats and designated sites due to dust emissions arising from the construction works. The biodiversity assessment has inherently considered air quality effects on biodiversity receptors. There are no additional effects caused by interactions.
Material Assets: Traffic	In the current assessment, traffic derived pollutants which may affect Air Quality and Climate have been deemed as negligible. Therefore, the impact of the interaction between air quality and climate is considered to be insignificant.

Conclusions
Appropriate mitigation measures have been recommended and will be implemented at the Site to minimise the risk of dust emissions arising during the Construction Phase and provided such measures are adhered to, it is not considered that significant air quality impacts will occur. Traffic-related pollutants have been assessed and determined as negligible, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

Table 14-7: Noise and Vibration

Noise and Vibration	
Summary	
Chapter 9 of this EIAR, *Noise and Vibration*, provides a description and assessment of the likely impact of the proposed activities from noise, and sets out appropriate mitigation measures where necessary. The Construction Phase of the Proposed Development can potentially give rise to temporary to short term noise and vibration associated with the operation of on-site machinery will be intermittent and will not create any major negative impacts beyond the Site boundary. This increased noise and vibration will not have an adverse effect on biodiversity during the Construction Phase of the Proposed Development. Increased Traffic as a result The Proposed Development will have no significant impact in the local network and therefore no noise impacts during both the Construction and Operational Phase of the Proposed Development.	
Interactions	
Population and Human Health	The impact assessment of noise and vibration has concluded that additional noise associated with the Proposed Development of will be intermittent and will not create any major negative impacts beyond the Site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation from the Proposed Development. No human health impacts are anticipated as a result of noise from the Proposed Development.
Biodiversity	It is not considered that the Noise and Vibration effects of the Proposed Development will not have an adverse impact on biodiversity in the local area. While the proposed Construction Phase will result in a temporary increase in noise and vibration, it is considered that this will not cause a significant disturbance to the local fauna including birds due to the proposed mitigation measures.
Material Assets: Traffic	The Proposed Development will not have a significant impact on traffic volumes in the local network, and therefore traffic will not result in any significant increases of noise at sensitive receptors.
Conclusions	
The operation of on-site machinery will be intermittent and last only for the duration of the Construction Phase. There will be no significant impacts on noise and vibration during the Operational Phase of the Proposed Development.	

Table 14-8: Landscape and Visual

Landscape and Visual	
Summary	
Chapter 10 of the EIAR, *Landscape and Visual Assessment*, provides a description and assessment of the likely impact of the Proposed Development on the landscape and visual amenities of the area. Proposed landscaping for the Proposed Development will interact with biodiversity and ecology throughout the Operational Phase of the Proposed Development. This landscaping will also have a visual interaction with Population and Human Health.	
Interactions	
Population and Human Health	It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the suburban village and residential nature of the surrounding landscape, will cause any issues for the residential local population.
Biodiversity	The proposed landscaping of the Site interacts with its biodiversity and ecology through the changes that will occur to the existing habitats and flora at the Site. The landscaping proposals will entail losses and contributions in terms of vegetation at the Site, which in turn will affect the ecology of the Site. The proposed landscaping will not result in significant adverse effects in this regard. It is noted that the Proposed Development further negates any habitat loss through the provision of a number of planted garden areas included in the project design. As such, no significant cumulative habitat loss will occur involving the Proposed Development.
Archaeology and Cultural Heritage	As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.
Conclusions	
There are no impacts expected on Population and Human Health, Biodiversity and Archaeology and Cultural Heritage as a result of changing landscape as a result of the Proposed Development.	

Table 14-9: Archaeology and Cultural Heritage

Archaeology and Cultural Heritage	
Summary	
Chapter 11 of the EIAR, *Archaeology and Cultural Heritage,* provides information on the known architectural, archaeological, and cultural heritage sites in the study area. There are no predicted impacts during the Construction or Operational Phases of the Proposed Development.	
Interactions	
Land and Soil	The Proposed Development will involve the movement of soil for the site to reach the required levels. There is potential for previously unrecorded archaeological features or deposits to be discovered during this process.
Landscape and Visual	As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.
Conclusions	
With the implementation of all mitigation measures detailed in Chapter 11, there will be no negative residual impacts upon the archaeological or cultural heritage resource.	

Table 14-10: Material Assets - Traffic, Waste and Utilities

Material Assets - Traffic, Waste and Utilities	
Summary	
Chapter 12 of the EIAR, *Material Assets*, provides an assessment of the potential impacts of the Proposed Development on Material Assets including traffic, built services and infrastructure. Construction Phase: The improper removal, handling and storage of waste materials could negatively impact on the health of construction workers as well as potential disruptions to water supply or sewerage systems could be negative impacts for the surrounding population, biodiversity, land, soil and hydrology. Additionally, there may be increased construction traffic. Operational Phase: Improper removal, handling and storage of waste materials could negatively impact on the health of the public and local biodiversity.	
Interactions	
Population and Human Health	In the absence of mitigation, the improper removal, handling and storage of waste could negatively impact on the health of construction workers. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health. Chapter 4 (Population and Human Health) of this EIAR has concluded that no long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.
Biodiversity	The improper handling and storage of waste during the Construction and Operational Phases could negatively impact on biodiversity. Potential impacts on biodiversity are addressed in Chapter 5 (Biodiversity).
Land and Soil	Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the site. Potential impacts on land and soils are addressed in Chapter 6.
Hydrology and Hydrogeology	All connections to the public water network (water supply or foul sewer), abstractions from water supply and discharges to the foul sewer during the Construction and Operational Phases will be under consent from Irish Water. An assessment of the potential impact of

	the Proposed Development on Water are addressed in Chapter 7 (Hydrology and Hydrogeology) of this EIAR. Chapter 7 has concluded that there are no likely significant adverse impacts on hydrology and hydrogeology anticipated regarding this Proposed Development.
Conclusions	
With the implementation of all mitigation measures detailed in the respective Chapters, there will be no negative residual impacts upon the Material Assets: Traffic, Waste and Utilities.	

14.4 References

EIAR Chapters 4 to 12 inclusive.

15 MITIGATION AND MONITORING MEASURES

15.1 Introduction

This EIAR has assessed the impacts and resulting effects likely to occur as a result of the Proposed Development on the various aspects of the receiving environment.

The Proposed Development will be operated in a manner that will ensure that the potential impacts on the receiving environment are avoided where possible. In cases where impacts or potential impacts have been identified, mitigation measures have been proposed to reduce the significance of particular impacts. These mitigation recommendations are contained within each chapter exploring specific environmental aspects.

This chapter of the EIAR collates and summarises the mitigation commitments made in Chapter 4 to Chapter 13.

15.2 Summary of Mitigation Measures

15.2.1 Population and Human Health

15.2.1.1 Construction Phase

15.2.1.1.1 Mitigation

No specific mitigation measures are required during the Construction Phase of the Proposed Development in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, mitigation measures in relation to air quality, noise, traffic, waste etc. are identified in their respective Chapters in this EIA Report.

15.2.1.1.2 Monitoring

No specific monitoring is proposed in relation to population and human health during the Construction or Operational Phase.

15.2.1.2 Operational Phase

15.2.1.2.1 Mitigation

No specific mitigation measures are required during the Operational Phase of the Proposed Development in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, mitigation measures in relation to air emissions, noise, traffic, waste are identified in their respective chapters in this EIA Report.

15.2.1.2.2 Monitoring

No specific monitoring is proposed in relation to population and human health during the Construction or Operational Phase.

15.2.2 Biodiversity

15.2.2.1 Construction Phase

15.2.2.1.1 Mitigation

Mitigation 1: Engagement of an Ecological Clerk of Works

Several key ecological receptors (KERs) were identified at the Site which will require further surveys prior to the commencement of and during the Construction Phase of the Proposed Development. The contractor will employ a suitably qualified Ecological Clerk of Works (ECoW) to oversee the implementation of the mitigation measures outlined below. The ECoW will be required to provide reports and written correspondence as requested in order to demonstrate compliance with the measures outlined in this report.

Mitigation 2: Construction Phase surface water management

The Proposed Development includes a detailed drainage plan that is assessed in full in Chapter 7 – Hydrology of this EIAR. This drainage plan and all associated measures have been taken into account in this Biodiversity Chapter but are not included in full (to avoid repetition). The drainage design for the Proposed Development aims to minimise surface water runoff arising on Site, to adequately control and manage surface water runoff from the Site containing suspended solids and to ensure that the hydrological function of the Garrynafela Stream and downstream waterbodies are not affected by the Proposed Development.

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 Environmental Section of Westmeath County Council.

Personnel working on Site will be trained in the implementation of environmental control and emergency procedures. Procedures and 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.
- 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.

A number of pollution-prevention measures for the Construction Phase of the Proposed Development are described in the outline Construction Environmental Management Plan (CEMP) accompanying this application under a separate cover. All measures outlined in the CEMP are established measures that are widely used in construction projects, and there is a

high degree of confidence in their success. The contractor will be required to employ an Environmental Manager and ECoW to assist with preparing a detailed CEMP and its implementation, and to advise on all works in close proximity to the Garrynafela Stream.

The following pollution prevention measures are included in the CEMP and summarised below:

- All works within and adjacent to the Garrynafela Stream will be planned in accordance with the contractor's ECoW and a method statement. The ECoW or Site Environmental Manager will give a toolbox talk in advance of works, and all working areas will be marked out clearly in advance of works.
- Silt-management measures will be implemented for all groundworks in order to prevent the release of any suspended solids into the Garrynafela Stream. This will include the use of straw bales/silt fences along the entire length of the Garrynafela Stream along the western Site boundary.
- Prior to the commencement of earthworks, silt fences/straw bales will be installed by suitably qualified Site personnel 10m back from the Garrynafela Stream. These measures will act as a temporary sediment control device to protect the Garrynafela Stream and downstream Lough Ree.
- The silt fencing/straw bales will be inspected daily based on Site and weather conditions for any signs of contamination or excessive silt deposits and records of these checks will be maintained.
- The main compound on Site will include a bunded area for the storage of pollutants, with additional areas for stockpiling of materials.
- There will be no cement washout on Site except for washout of chutes, the washings of which will be collected into an appropriate container for compliant off-Site management.
- Where cast-in-place concrete is required, all work will be carried out in the dry and effectively isolated from the Garrynafela Stream. Pre-cast elements will be used where possible. No batching of wet-concrete products will occur on Site.
- All plant machinery required on Site will be serviced before being mobilised to Site.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling stations located on Site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on Site. Refuelling stations will be located at a distance greater than 50m from the Garrynafela Stream or on-site drainage infrastructure. The plant refuelling procedures will be detailed in the contractor's method statement.
- Spill kits will be made available in each item of plant required on-site.
- A regular review of the weather forecast for extremely 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.
- As per the CEMP, where there is a requirement to collect and treat surface water within the Site during the Construction Phase, run-off from the working Site or any areas of exposed soil will be channelled and intercepted at regular intervals via perimeter swales. The swales will be installed at low points around the construction areas. If

required, water will be pumped from the swales into sediment bags with overflows directed to land rather than a watercourse or surface water sewer.

- Discharge to land will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge from the silt bag will be enclosed by a perimeter of double silt fencing.
- No pumped construction water will be discharged directly to any drainage ditch or watercourse.
- The developer will ensure that erosion control i.e., silt-fencing, straw bales, silt bags and swales are regularly maintained for the duration of 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 as much as possible. Where this is not possible, designated temporary material storage areas will be used.
- These temporary storage areas will be located at least 10m from the Garrynafela Stream and will be surrounded by silt-fencing to filter any suspended solids from surface waters arising from these materials.
- 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.
- All personnel working on Site will be trained in pollution incident control response.
- 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, BPGCD005).
- All associated waste from portaloos and/or containerised toilets and welfare units will be removed from the Site by a licenced waste disposal contractor.

Culvert placement

EOB drawing no. 22-017-1101 indicates that approximately 0.2 river km of the Garrynafela Stream will be culverted to facilitate the Proposed Development. All works adjacent to the Garrynafela Stream will be carried out in accordance with IFI *Guidance on Protection of Fisheries During Construction Works in and Adjacent to Waters* (IFI, 2016) and the National Roads Authority (now TII) *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*.

The following mitigation measures will protect the Garrynafela Stream during culvert placement:

- A suitably qualified ECoW will be present on-Site during culvert placement.
- The Garrynafela Stream will be culverted at the outset of construction works, prior to the stripping of the topsoil on Site.
- The Garrynafela Stream will be culverted during low flow / dry conditions, and this will be undertaken in sections. The upstream end of the Garrynafela Stream will be dammed and any water will over over-pumped via a silt bag to the downstream end of the waterbody.
- Where in-stream bed material is to be removed, coarse aggregates, if present, should be stockpiled for replacement in the reformed channel.
- Entry to the channel of the Garrynafela Stream by vehicles and/or personnel will not be permitted unless absolutely necessary.

- Where required, instream works will only be carried out during the period July – September.
- Instream machine works will 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.
- If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from the Garrynafela Stream.
- Works involving the breaking of stream banks e.g., any reprofiling of the stream channel, will be carried out with suitable and effective mitigation in place to minimise/prevent sediment release to the stream i.e., silt-traps and other suitable in-stream measures for the collection/filtration of sediment e.g., straw bales.

Mitigation 3: Protection of habitats

Trees that are proposed to be retained on Site (as per the tree protection plan accompanying this application drawing no. 220530-P-12) will be protected for the duration of the Construction works by protective fencing, signage and/or ground protection prior to any materials or machinery being brought on Site and prior to any development or soil stripping taking place. Areas that are designated for new planting will similarly be protected. Barriers will be fit for the purpose of excluding construction activity. In most cases barriers will consist of a scaffold framework comprising a vertical and horizontal framework, well braced to resist impacts. To ensure the protective barriers are respected, clear concise signage will be affixed to the barrier in an unrestricted easily viewer location. The protective barriers will remain in place in an undisturbed condition and only removed on completion of all construction activity. Any breach of the protective fencing will be reported to the consulting arborist.

During the course of the Construction Phase the integrity of the protective fencing must be respected and remain in place at all times. No building materials or soil heaps will be stored within this area. Should essential works need to take place within the root protection area, the project arborist must be informed in advance and any necessary mitigation measures will be put in place. The protective fencing will remain in situ for the duration of the project and will only be removed upon completion of all works. Construction will only commence once the protective barriers and/or ground protection have been erected.

Further information on Tree Protection measures can be found in the Arboricultural Impact Assessment accompanying this application (Charles McCorkell, 2023).

Invasive species

No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site during surveys. As such, no significant risk of impacts relating to the spread of invasive plant species exists at the Site. Nevertheless, efforts should be made to remove such plants and minimise any risk of spread off-Site. The respective distributions of the non-native species recorded on Site (sycamore and Norway maple) are not significant and their removal will not be an issue.

Transport Infrastructure Ireland (2020) guidance ‘The Management of Invasive Alien Plant Species on National Roads – Technical Guidance’ will be consulted with regards the treatment, removal and disposal of invasive flora at the Site.

The following measures will be adhered to, to avoid the introduction or dissemination of invasive species to and from the Site of the Proposed Development:

- Validation that all machinery / vehicles are free of Invasive Alien Plant Species (IAPS) prior to their first introduction to Site.
- Certification from the suppliers that all imported soils and other fill/landscaping materials are free of IAPS.
- A regular schedule of Site inspections across the IAPS growing season, for the duration of the construction works.
- Validation that all machinery / vehicles are free of IAPS, prior to leaving the Site.
- Appropriate and effective Site biosecurity hygiene.

Mitigation 4: Protection of terrestrial fauna

Small mammals

As best-practice, all construction related waste on Site e.g. plastic sheeting, netting etc. will be kept in designated areas on Site and kept off ground level to protect hedgehogs from entrapment and possible death. These measures will also act to mitigate potential negative impacts on any other small mammal species potentially utilising the Site.

Log piles

Piles of logs and other woody vegetation arising from the vegetation clearance on Site will be left in suitable secluded margins of the Site; to provide habitat for common frog, lizards and small mammals such as hedgehog and pygmy shrew for the duration of the Construction Phase and operational lifetime of the Proposed Development where possible. These areas of woody debris will also benefit local invertebrate species through the provision of shelter and food sources.

Pre-construction mammal surveys

In accordance with the NRA Guidance, pre-construction mammal surveys will be undertaken at the Site to identify evidence of protected mammals (e.g., badger, pine marten, red squirrel) within the works area associated with the Proposed Development. The survey will be undertaken to ensure that such protected species have not taken up residence within or close to the development footprint. Should breeding or resting places be recorded in the pre-construction surveys, a site-specific mitigation plan shall be prepared and agreed with the NPWS prior to the commencement of works. It is not anticipated that any protected mammal breeding/resting places will be encountered or required to be excluded due to the Proposed Development based on the findings of the surveys previously undertaken at the Site. Pre-construction mammal surveys will be undertaken 8-12 weeks prior to the commencement of vegetation removal on Site.

Although not directly recorded during surveys, the Site was identified as holding potentially suitable habitat for red squirrel and pine marten (woodland and treelines). The clearing of trees on Site will take place outside of the breeding season for these mammals (clearance to take place between late September and November). An ECoW will be present on-site during felling, the ECoW will undertake pre-felling assessments of each tree to search for dreys or individuals within the canopy immediately prior to tree felling works. If dreys or individuals are identified works will stop until the dreys are confirmed to be inactive or the individuals have moved out

of the danger zone of felling works. Felling will occur in a consistent direction moving to prevent entrapment and to encourage red squirrel and other mammals in the direction of the trees identified for retention. The landscape plan for the Proposed Development includes abundant additional tree planting on Site, the proposed planting connects to the retained treelines as much as possible based on Site constraints.

Lizard and Amphibians

To ensure no adverse effect of any herptiles which may be present on the wider Site, a phased approach to clearance, under the supervision of an ECoW, will be used to allow wildlife to move from any suitable habitat that will be removed. This will take place during weather that is suitable for reptiles and amphibians to be active (above 10°C with little rain), during the main activity season (generally March to September inclusive):

- Phase 1 – Cutting vegetation to 150-200 mm and removing the arisings;
- Phase 2 – Hand-searching the cut areas (conducted by an ecologist) and removing any sheltering habitat (e.g. logs or debris) then cutting vegetation to ground level and removing the arisings; and
- Phase 3 – Soil scrape.

Should any suitable refugia (such as log piles) need to be removed, this will be undertaken outside the reptile gravid period (May to July) and will be supervised by the ecologist.

Once an area of the Site has been cleared of scrub and vegetation to allow works, it will be maintained this way to ensure no suitable habitat for lizard develops i.e., no new piles of rubble/logs etc will be created within the active construction site; these can be deposited along the outer margins of the Site as new habitat. Furthermore, construction staff will be briefed on herptiles and remain vigilant for the presence of lizards and amphibians throughout the Construction Phase. Should any hibernating herptiles be discovered, the works in that area will cease, the ecologist will be contacted immediately and will move the lizard carefully to the Site's outer boundaries. The works can then continue in that area once the ecologist confirms no lizards are at risk.

Vegetation clearance

Any clearance of vegetation will be carried out outside the main bird breeding season, i.e., outside the period of 1st March to 31st August, in compliance with the Wildlife Act 1976 (as amended). Should any vegetation removal be required during this period, this vegetation will be checked for bird or nests by a qualified Ecologist. If encountered, the precise location within the hedgerow/trees and the species of bird present will be recorded. If works require the removal of an active nest, the area will be protected and the NPWS will be consulted prior to any works commencing in this area. The Site manager will be informed of the presence of nesting birds and advised that no works can commence in this area until further notice. Appropriate protection measures will be implemented in consultation with the project ecologist.

Table 15-1 provides guidance for when vegetation clearance is permissible. Information sources include the Herpetological Society of Ireland, British Hedgehog Preservation Society's *Hedgehogs and Development and the Wildlife (Amendment) Act*, 2000.

The preferred period for vegetation clearance is within the months of late **September and October**. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., hedgehog, pygmy shrew). Where this

seasonal restriction cannot be observed, a check for active roosts and nests will be carried out immediately prior to any site clearance by an appropriately qualified ecologist/ ornithologist and repeated as required to ensure compliance with legislative requirements.

Table 15-1: Seasonal restrictions on vegetation removal. Red boxes indicate periods when clearance/works are not permissible.

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Amphibians	Vegetation/ habitat clearance permissible (July – Feb).		Amphibian breeding season (estimated). No ditch destruction unless confirmed to be devoid of tadpoles and other signs of amphibians (March – June).				Vegetation/ habitat clearance permissible (July – Feb.					
Common Lizard	Lizard Hibernation Season. No habitat clearance permissible (Nov - Feb).		Active period. Habitat (scrub, grassland) clearance permissible (Early March – October)								Lizard Hibernation Season. No habitat clearance permissible (Nov – Feb).	
Breeding Birds	Vegetation clearance permissible (Sept – Feb)		Nesting bird season. No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist (Mar – Aug).						Vegetation clearance permissible (Sep – Feb).			
Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov - Aug).								Preferred period for tree-felling (Sep – Oct).		Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov – Aug)	
Hibernating mammals (e.g., Hedgehog, Pygmy Shrew)	Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist (Nov - Mar).			Vegetation clearance permissible (April – Oct).							Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist (Nov – Mar).	
Red squirrel and pine marten	Tree felling to be avoided unless confirmed to be devoid of red squirrel and pine marten by an ecologist (December – early September)								Preferred period for tree felling (late September – November).			Tree felling to be avoided

Mitigation 4: Protection of bats

Bat Friendly Tree Felling

No bat roosts were confirmed on Site however two trees (T1894 and T1895) were considered to hold 'moderate' roost potential for bats. These trees will require two pre-felling emergence surveys to be conducted within the period of May – September by a bat ecologist as per the BCT Guidelines (Collins, 2016). The results these surveys will inform further recommendations e.g., where a roost is identified, further surveys and a derogation licence will be required, and no felling will take place until this licence is obtained. At the locations where emergence surveys have shown that bats are not present, bat roost features will be blocked before later felling. Felling of trees with roost potential but confirmed devoid of bats will be by soft-felling, where the tree in question is section felled by a tree surgeon under the supervision of a bat ecologist if the bat ecologist recommends it. If the bat specialist is content that section felling is not required, then trees will be felled as follows (as per NRA (Now TII) 2005 Guidelines):

- Tree-felling will be undertaken in the months of September and October. This is the transitional period between when young bats are starting to fly from maternity roosts and the hibernation season and are less vulnerable. This approach will also avoid the nesting bird season.
- Felling during the winter months will be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as bat body temperature is too low and they may have to consume too much body fat to survive.
- Tree-felling will be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. To ensure the optimum warning for any roosting bats that may still be present, an affected tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then be pushed to the ground slowly and will remain in place for a period of at least 24 hours, and preferably 48 hours to allow bats to escape.
- When felling trees with a chainsaw, it is important to ensure that the rate of fall is not accelerated by the use of a chain and vehicle (e.g., tractor). It is unlikely that a bat would survive such a heavy impact.
- A derogation licence from the NPWS may be required for felling if during tree removal works bats are found to be roosting in any affected trees. A derogation licence will also be required if works are required to the confirmed roost on Site, or if the roost will be disturbed through construction and operational impacts.

A pre-commencement check will be required for any other trees on Site noted to have a change in tree structure between the initial Site surveys and the commencement of works on Site. This will ensure no new potential roost features have formed. The pre-commencement check is required as the roost potential of trees on Site may change between the time of writing this report and the commencement of works; through storm damage etc. Should bats be found, felling will be postponed until a derogation licence is obtained by the bat ecologist from the NPWS. This will avoid any harm to bats and the committing of an offence under the Wildlife Act 1976 as amended.

Site Lighting

Site lighting may be required during the Construction Phase, to protect bats and other nocturnal fauna from excess night-time lighting, the following luminaire specifications, taken from the latest guidance (ILP, 2018) will be adhered to during the Construction Phase:

- Retained trees will not incur an increase in the current lux level due to Construction Phase lighting.
- All luminaires 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 will be used to reduce the blue light component of the LED spectrum).
- Column heights will be carefully considered to minimise light spill, the shortest column height allowed will be used where possible.
- Only luminaires with an upward light ration 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 (1minute) timers.

Mitigation 5: Protection of semi-aquatic and aquatic fauna

Removal of wet grassland and scrub habitat

The Site provides potential habitat for common frog and smooth newt in the form of the wet grassland and scrub. Prior to the commencement of works on Site, the Site ECoW will conduct surveys for breeding frog and newts. The Site will be surveyed during the optimal time of year for signs of breeding activity (amphibian adults, spawn and juveniles). Survey methodology will take consideration of the National Roads Authority (NRA, 2009), now Transport Infrastructure Ireland (TII) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes, The Irish Wildlife Trust National Smooth Newt Survey 2013 Report (Meehan, 2013) and the National Frog Survey of Ireland 2010/11 (Reid et al. 2013). Should frog or newt or their young require removal to allow works to proceed, the NPWS will be consulted by the project ecologist prior to any such works commencing and a method statement may be provided on how to proceed with works.

Otter

Although included as a precautionary KER, otters are unlikely to be significantly affected by the Proposed Development. Otters are a QI for Lough Ree SAC, downstream of the Site along the Garrynafela Stream. The surface water protection measures adopted will serve to protect water quality in the Garrynafela Stream, which will in turn limit and/or eliminate any potential negative impacts on prey availability for otter downstream of the Site.

Mitigation 6: Reduction of noise and dust related impacts

Reduction of noise related 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. The following best practise measures will be put in place to ensure the minimisation of potential impacts on fauna as a result of the Proposed Development. Limiting the hours during which Site activities likely to create high levels of noise are permitted.

- Establishing channels of communication between the contractor/developer, local authority and residents.
- Appointing a Site representative responsible for matters relating to noise.
- 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.
- 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 and will ensure no significant dust related impacts occur on nearby sensitive receptors including local faunal species:

- 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.
- 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 will be used at Site exit points to remove caked-on dirt from tyre tracks.
- Equipment will be washed at the end of each workday.
- If practical, wheel-washing facilities will 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 will 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 will wastewater from equipment, wheel or surface cleaning enter the Garrynafela Stream.

15.2.2.1.2 Monitoring

Regular monitoring will be carried out by the contractor to ensure water quality protection measures (e.g., straw bales, silt fences and swales) are working throughout the entire Construction Phase. All containment and treatment facilities will be maintained and inspected regularly based on Site and weather conditions for any signs of contamination of excessive silt deposits and records of these checks will be maintained.

15.2.2.2 Operational Phase

15.2.2.2.1 Mitigation

Protection and enhancement of habitats

The landscaped sections of the Proposed Development will be managed in a way so as to mitigate the loss of the existing hedgerows and treelines as much as is possible. In this way new hedgerows and treelines will be maximised in the ecological value they provide at the Site, with habitat connectivity ensured along the margins of the Proposed Development, connecting it in with the wider field boundary network in the area. This connectivity is vital for wildlife such as birds, bats, mammals, and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and treelines in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area.

This low intervention approach may not be suitable for the more landscaped areas of the Site, which may need to be maintained to a higher degree for health and safety or aesthetic reasons. However, a high quantity of native species is included in the landscape design in these locations to maximise the biodiversity value of these internal landscaped parts of the Site.

For the hedgerows running along the outer margins of the Site, the following management approach is proposed to maximise their biodiversity value and offset the loss of existing hedgerows at the Site:

- Hedgerows will be maintained with a natural meadow strip of 1-2m at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators.

A two-cut management approach is ideal for suppressing coarse grasses and encouraging wildflowers. Cut the hedgerow basal strip once during February and March (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge once again during September and October (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).

- N.B. Raising the cutter bar on the back cut will lower the risk to amphibians, reptiles and small mammals.
- Hedgerows, where possible, should be allowed to reach at least 2.5m in height, and should be trimmed in an A-shape; maintaining a wider base to compliment the natural meadow strip at their base.
- Where hedgerow trimming needs to occur delay trimming as late as possible – until January and February as the surviving berry crop will provide valuable food for wildlife. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow cutting should be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) needs to be taken.
- Where possible, cut these outer boundary hedgerows on a minimum 3-year cycle (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (blackthorn in March, hawthorn in May).
- Where they occur naturally, bramble and ivy should be allowed grow in hedgerows, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

- Hedgerows will not be over-managed. Tightly cut hedges mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.
- Hedgerows will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds.
- Do not use pesticide/ herbicide sprays or fertilisers near hedgerows, scrub or areas of wildflower meadows as they can have an extremely negative effect on the variety of plants and animals that live there.

Landscape design

The landscape design for the Site includes a planting palette which has been specifically chosen for its pollinator friendly species as well as the overall aesthetic value of the trees, shrubs and perennials. Pollinator friendly species incorporated into the landscape design include English lavender (*Lavandula angustifolia*), dogwood (*Cornus alba*), skimmia (*Skimmia japonica*), orange glow (*Pyracantha* spp.), spotted dead nettle (*Lamium maculatum*) and sweet William (*Dianthus barbatus*). An area of traditional Irish wildflower meadow planting is included along the western site boundary. All wildflower seeds will be Irish Provenance Certified Seed, from a reputable source such as Design by Nature (Wildflowers.ie). To maximise the biodiversity value of the landscaping at the Site, consideration has been made to the All-Ireland Pollinator Plan planting code (NBDC, 2015).

The landscape plan also includes the use of semi-mature tree planting with a high quantity of native species including oak, downy birch (*Betula pubescens*), hawthorn, blackthorn and holly (*Ilex aquifolium).* Native planting is proposed along the western Site boundary to reinforce the existing treelines and hedgerows. Although the Proposed Development will result in a loss of 38 trees on Site, the landscape design for the Site includes the planting of 420 new trees, which will be planted throughout the Site. Overall, the landscape design will have a *positive, permanent, moderate* impact at a local scale.

Figure 15-1. Landscape design for the Proposed Development (Park Hood, Drg. No. 7583-L-2000)

Wildlife friendly lighting

To minimise disturbance to bats in the immediate vicinity of the Site, the lighting and layout of the Proposed Development has been designed to minimise light spill. This will be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust ‘Artificial Lighting and Wildlife Interim Guidance’ and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'.

Bat-friendly lighting measures have been incorporated into the Proposed Development design and associated lighting plan. Dark buffer zones can be effectively used to separate important habitats or features from lighting by forming a dark perimeter around them (ILP, 2018). Buffer zones rely on ensuring light levels within a certain distance of features do not exceed certain defined limits, generally 1 lux or less. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature. Examples of this application can be seen in Figure 13-3.

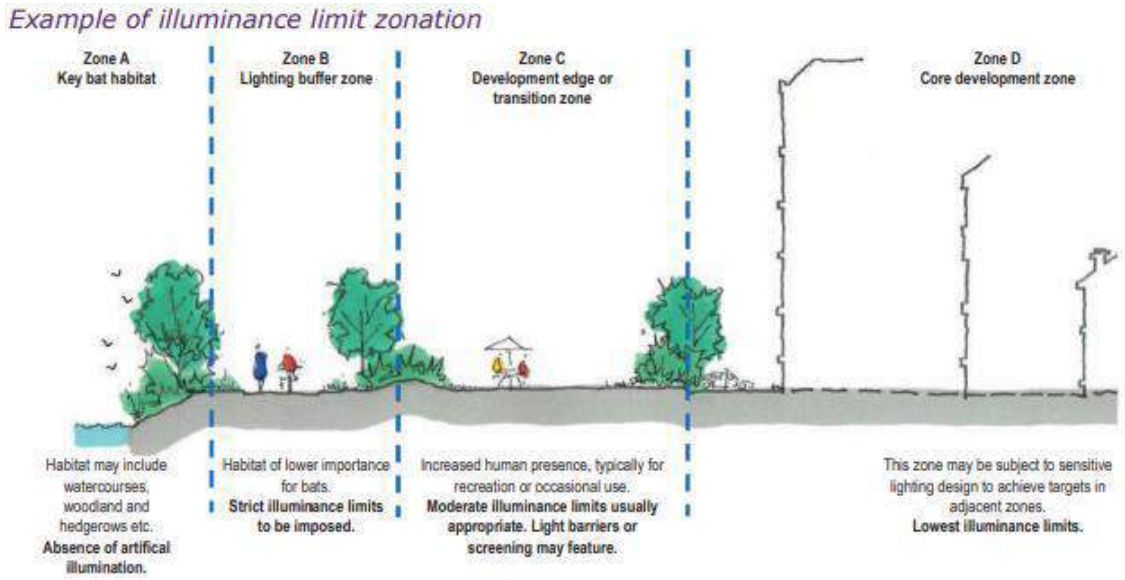


Figure 15-2: External lighting zonation diagram adapted from ILP (2018).

Night-time lighting across the Site will be kept to a minimum (once satisfying health and safety requirements), through the reduction of light spill from the buildings via windows/entrances, and the reduction of spill/glare from outdoor lighting in place on the building exterior and through the Proposed Development grounds.

Incorporation of appropriate luminaire specifications will have a considerable input in mitigating the potential impact of night-time lighting on local bats. Based on the above guidance documents, the lighting scheme for the Proposed Development, as confirmed by the lighting design team (VeeLite), has incorporated the following measures:

- Luminaires will have zero upward light ratio, to minimise light pollution, energy waste and impact on wildlife.
- Lighting will be directional on to the roadways and footways only with minimal spillage of light onto adjoining habitats.

- LED luminaries are utilised where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- Narrow spectrum bulbs will be used to lower the range of species affected by lighting. Light sources that emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum will be utilised to avoid attracting lots of insects. Lighting regimes that attract lots of insects result in a reduction of insects in other areas like parks and gardens that bats may utilise for foraging.
- Maintain dark zones of 10m in width for foraging bats in areas where lighting is not necessary e.g., along the vegetated boundaries of the Site. However, where lighting is required, this lighting will be placed at a minimum height using the lowest lux value permitted for public health and safety.
- Motion sensor and timer activated lighting will be in place at the Site to ensure minimal light spill occurs during the hours of darkness.
- The colour rendering of the selected light fittings will be 2700k making the LED fittings a warmer light, helping to further minimize the impact on the local wildlife.
- Retained treelines along the Site boundaries will, as much as possible while satisfying health and safety requirements, not incur an increase in current lux levels due to the Proposed Development.
- Planting will provide areas of darkness suitable for bats to feed and commute.
- Reflective surfaces will not be placed under lights.

Bird box scheme

Bird boxes will be installed as part of the landscape plane, the placement of the bird boxes will be overseen by the appointed ECoW. The boxes will be durable and will be firm and secure to their supports, and only placed on trees that are robust and large enough to support bird boxes.

There are various standard bird box options and at least two of each of the following box types will be installed.

- ‘Hole type’ bird box (28 mm hole) – for example the Eco Small Bird Box, which can be found at the following link - https://www.nhbs.com/eco-small-bird-box
- Open fronted bird boxes for blackbirds – for example the Blackbird FSC Nest Box, which can be found at the following link - https://www.nhbs.com/blackbird-fsc-nest-box
- Open fronted bird boxes for wrens and robins – for example the Eco Robin (Open-Fronted) Nest Box, which can be found at the following link - https://www.nhbs.com/eco-robin-open-fronted-nest-box

Hole type bird boxes should be positioned 2-4m off the ground, with good-visibility, a clear flight line and away from the prevailing wind direction.

The open fronted boxes for robin, wren and blackbirds should be installed lower than 2m but amongst dense vegetation (e.g., hedges or areas of scrub that develop within the Site), or newly planted vegetation that will grow to become dense upon establishment and somewhere cats and other predators won’t easily see or access them.

Unless the areas are very sheltered, bird boxes should be fixed facing between north and south-east to avoid the hot sun and the wettest winds. Bird box placement will be directed by the ECoW and amended as appropriate.

Bat roosting opportunities

To offset the loss of trees on Site, 10 bat boxes will be erected on suitably large trees along the boundaries of the Site to provide future roosting opportunities. The guidance of a suitably qualified Bat ecologist will be sought in the selection of bat box type and placement; to avoid disturbance from lighting generated by the Proposed Development and maximise the likelihood of their uptake by local bats. Bat boxes will be placed over 4m high (if possible) onto retained mature trees, the trees in which they are placed will not be illuminated.

Hedgehog highways

By creating a number of separate private dwellings and associated gardens at the Site, large areas of the Site ultimately become fragmented and potentially inaccessible to species such as hedgehogs, which like to roam each night in search of food (garden pests e.g., slugs). This can be mitigated by ensuring that the boundaries and barriers within and surrounding the Site i.e., garden fencing, railings and gates are permeable for hedgehogs. This can be done by:

- The use of fence panels with 13 x 13 cm holes at ground level (hedgehog holes).
- Leaving a sufficient gap beneath gates.
- Leaving brick spaces at the base of brick walls.

A variety of fence suppliers' stock specific hedgehog-friendly fencing options, which can be easily incorporated at little to no additional costs. These simple measures will provide habitat connectivity at the Site for small mammals and reduce the impact of the land-use change on these species. Including details of hedgehog-friendly features in the new homeowner's welcome pack will raise awareness and prevent homeowners from reversing these features, for instance blocking fence holes.

Figure 15-3: Example of 'hedgehog highways' that can maintain habitat connectivity for hedgehogs in residential developments (Images: BHPS Guidance document).

15.2.2.2.2 Monitoring

The proposed landscape scheme will be maintained and any plants that die, become diseased or damaged or are removed within 5 years will be replaced within the following planting season by plants of a similar size and species.

15.2.3 Land and Soils

15.2.3.1 Construction Phase

15.2.3.1.1 Mitigation

A Construction Environmental Management Plan (CEMP) (EOBMS, 2023d) and Resource & Waste Management Plan (RWMP) (AWN, 2022b) have been prepared for the Proposed Development as part of the planning application. The appointed contractor will further develop the CEMP and RWMP to ensure site specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the projects and prevent any potential emissions to ground having regard to relevant industry standards (e.g., Guide for Consultants and Contractors, CIRIA -C532', CIRIA, 2001).

The CEMP (EOBMS, 2023d) provides detailed construction phasing and methods to manage and prevent any potential emissions to ground having regard to relevant industry standards. The appointed

The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development.

Detailed design will be specified by an appropriately qualified geotechnical engineer for the construction of foundation at the Site to ensure that ground conditions are engineered and controlled appropriately.

Mitigation measures specific to land, soil and geology that the appointed contractor will incorporate into the CEMP and RWMP are outlined in the following sections.

Import of Aggregates

Contract and procurement procedures will ensure that all imported aggregates required for the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates shall be subject to management and control procedures which shall include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

Management of Stockpiles (soil and other materials/ waste)

For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area shall be identified and designated.
- All stockpiles shall be assigned a stockpile number.
- Material identified for reuse onsite, offsite and waste materials will be individually segregated; and all segregation, storage & stockpiling locations will be clearly delineated on the Site drawings.
- Soil stockpiles will be sealed to prevent run-off from the stockpiled material generation and/or the generation of dust.
- Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross-contamination of the soil below or cross contamination with soil.
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust; and
- Stockpiles will not be located near Site boundaries or sensitive receptors and a set-back of 50m will be maintained from watercourses.

When a stockpile has been sampled for classification purposes, it shall be considered to be complete, and no more soil shall be added to that stockpile prior to removal off Site. An excavation/stockpile register shall be maintained on-site

Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be stored on-site in such a manner as to:

- Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour control measures, as may be required).
- Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery; and
- Prevent hazards to site workers and the general public during construction phase (largely noise, vibration and dust).

Reuse of Soils Onsite

The reuse of excavated soil for the Proposed Development will be subject to assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

Control and Management of Dust

Handling of soils will be undertaken in accordance with documented procures that will be set out in order to protect ground and minimise airborne dust. The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. Specific measures as outlined in the CEMP includes:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the Site and along the main transport routes to the Site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of Soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph; Daily inspection of construction sites to examine dust measures and their effectiveness.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the Site will pass through a wheel cleansing area prior to entering the local road network.

Concrete Works

Where possible precast concrete will be used for culverts and concrete works. However, where cast-in-place concrete is required (i.e., foundations, footpaths), all work will be carried out to avoid any contamination of the receiving soil and geological environment through the use of appropriate design and methods implemented by the Contractor and in accordance with industry standards.

All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. Concrete mixer trucks will not be permitted to wash out on-site with the exception of cleaning the chute into a container which will then be emptied into a skip for appropriate compliant removal offsite.

The following mitigation measures are outlined in the CEMP to avoid release of cement leachate to the Site:

- All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. There will be no batching of wet-cement products on Site.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

The piling methodology (specified at detailed design stage) where required, will minimise the potential for the introduction of any temporary conduit between any potential source of

contamination at the ground surface and underlying soils, subsoils and bedrock. The piling method will include procedures to ensure any potential impact to underlying ground is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

Handling of Chemicals and Fuels

Fuel, oils and chemicals used during construction are classified as hazardous. All fuels/soil and all storage tanks and draw-off points will be located in a dedicated, bunded and secure area of the Site (AWN, 2022b). Only dedicated trained and competent personal will carry out refuelling operations (EOBMS, 2023d). Each station will be fully contained equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works onsite.

The CEMP (EOBMS, 2022d) outlines fuel and oil control procedures which will be implemented during the Construction of the Proposed Development including:

- All plant and machinery will be serviced before being mobilized to Site.
- No refueling of machinery or overnight parking of machinery is permitted in areas adjacent to watercourses or on-site drainage infrastructure.
- Fuel volumes stored on site should be minimised. There will be no bulk storage of fuels.
- On-site refueling will only take place at distances greater than 50 meters from nearest water courses or Site drainage infrastructure. Refulling will take place by direct filling from a delivery truck or using a mobile double skinned fuel bower. The fuel will re-filled off site and will towed around the site as required.
- On-site refueling of machinery will be carried out using an oil company vehicle sourced from a local supplier.
- Only dedicated trained and competent personnel will carry out refueling operations.
- A spill kit and drip tray shall be on Site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling.
- Spill kits shall be available in each item of plant required.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.

The plant refueling procedures described above shall be detailed in the contractor's method statements (EOBMS, 2023d).

Any required quality of fuels and chemicals will be stored in bunded storage tanks. Bunds will have regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013) and Enterprise Ireland. Best Practice Guide BPGCS005. Oil Storage Guidelines. All tank and drum storage areas will, 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.

Only emergency maintenance will be carried out on Site.

Emergency Procedures

Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.

Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.

In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with current industry best practice procedures and EPA guidelines.

Site staff will be familiar with emergency procedures in the event of accidental fuel spillages and all staff on-site will be fully trained on the use of equipment to be used on-site.

The emergency procedures set out in the CEMP will be implemented and further developed by the appointed Contractor in advance of the works commencing.

Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Temporary port-a-loo toilets will be used during construction. The facilities will require periodic waste pumping and waste haulage offsite. Wastewater will be tankered off-site by permitted waste collector to wastewater treatment plant. The removal and disposal of wastewater from Site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007 (EOBMS, 2023d). All waste from welfare facilities will be managed in accordance with the relevant statutory obligations. Removal of waste offsite will be by an appropriately authorised contractor in compliance with all legislative requirements.

Geotechnical Design

Appropriate geotechnical design avoidance and reductive measures will be incorporate in the design to prevent any potential impacts associated with the ground conditions, such measures as set out in the geotechnical report include (but are not limited to):

- Trench fill to extend to depth ranging from 1 to 1.9m below existing levels to reach suitable bearing stratum.
- Removal or soft/ very loose soil and resulting voids backfilled with Grade ST1 concrete.
- Adoption of piles where trench fill is not achievable (due to shallow groundwater levels or wall collapse).
- Detailed design of piles in conjunction with specialised piling contractor.
- Recommendation that there is a suspension on excavation, if ground conditions vary significant from those identified in the boreholes of the ground investigation.

The specific type of ground improvement and structural design will be determined at the detailed design stage. The detailed design will be specified by an appropriately qualified geotechnical Engineer for the construction of Proposed Development to ensure that ground conditions are engineered and controlled appropriately.

The Site is identified as not being located within a High Radon Area however, as a high radon level can be found in any area, in any part of the country, standard design measures including appropriate radon membranes will be incorporated into the design of buildings in accordance with relevant Building Regulations.

The Site Investigation Report did not reference any issues associated with pyrite. All aggregates imported to the Site for use in the Proposed Development will be subject to strict quality control procedures in accordance with the design specification and relevant Building Regulations therefore avoiding any potential issues with pyrite in aggregates

Export of Soil and Stone Material

There is no removal offsite required for the design of the Proposed Development however if require the removal offsite of surplus soil and stone from the Proposed Development will be reused as a by-product under Article 27 by-product notification or sent for recovery at a suitable authorised facility in accordance the Waste Management Act 1996 -2011 as amended and associated regulations and guidance. It will be the contractor's responsibility to engage a specialist waste service contractor (s) who will possess the requisite authorisations, for the collection and movement of by-product / waste materials offsite. Material will be brought to an authorised facility which currently holds an appropriate waste facility permit or licence for the specified waste types. Waste Permitting, Licences and Documentation under the Waste Management (Collection Permit) Regulations 2007, as amended, a collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO), must be held by each waste collection contractor.

Sampling and waste classification assessment soil to excavated will be undertaken in advance removal of any material off-site to ensure that the management and removal of soils off-site will be undertaken in accordance with the Waste Management Act 1996 -2011 as amended and associated regulations and guidance

All surplus materials and any waste will be removed off-site in accordance with the requirements outlined in the RWMP (AWN, 2022) and will be managed in accordance with all legal obligations.

15.2.3.1.2 Monitoring

During the Construction Phase of the Proposed Development the following monitoring measures will be implemented:

- Routine monitoring and inspection during refuelling and concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soil onsite and for removal offsite
    - Record keeping

  - Traceability of all materials, surplus soil and other waste removed from the Proposed Development Site: and
  - Ensure records are maintained of materials accepted at the end destination
- Stockpiles will be inspected daily by the appointed contractor to ensure materials are segregated on-site for the appropriate waste stream and disposal destination and to ensure there is runoff from the stockpiled materials and/or generation of dust.

Imported material will be subject to assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

Sampling and waste classification assessment of potentially contaminated soil to be excavated will be undertaken in advance removal of any material off-site to ensure that the management and removal of soils off-site will be undertaken in accordance with the Waste Management Act 1996 -2011 as amended and associated regulations and guidance.

15.2.3.2 Operational Phase

15.2.3.2.1 Mitigation

There are no mitigation measures specifically required in relation to Land Soil and Geology for the Operational Phase.

15.2.3.2.2 Monitoring

Ongoing regular operational monitoring of the SuDs measures will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development.

15.2.4 Hydrology

15.2.4.1 Construction Phase

15.2.4.1.1 Mitigation

The Construction Environmental Management Plan (CEMP) (EOBMS, 2023d) and a Resource Waste Management Plan (RWMP) (AWN, 2022b) will be implemented by the appropriate contractor to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and ensure the construction activities do not adversely impact on the environment.

Mitigation measures will be adopted as part of the construction works on the Proposed Development Site. The measures will address the main activities of potential impact which include:

- Control and management of water and surface runoff.
- Control of management of instream works
- Management of dewatering during construction.
- Management and control of materials from off-site sources.
- Appropriate fuel and chemical handling, transport, and storage; and
- Management of accidental release of contaminants at the Site.

The construction works will be managed in accordance with all statutory obligations and regulations and with standard international best practice; good construction management practices will minimise the risk of pollution from construction activities at the Site including but not limited to:

- EPA 2004 and revised 2013) IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities;
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004;
- Inland Fisheries Ireland (2020) Planning for Watercourses in Urban Environments;
- Inland fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters;
- Construction Industry Research and Information Association (CIRIA) standards:
    - The SuDs Manual, 2015 (C753);
    - Environmental Good Practice on Site, 2015 (C741);
    - Control of Water Pollution from Linear Construction Projects: Site Guide, 2006 (C649);
    - Control of Water Pollution from Linear Construction Projects: Technical Guidance, 2006 (C648); and
    - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, 2001 (C532).

Control and Management of Water

Groundwater may be encountered during the construction works. Robust dewatering and water treatment methodologies in accordance with best practice standards (CIRIA – C750), the CEMP (EOBMS (2023d), RWMP (AWN, 2022b) and regulatory consents to minimise the potential impact on the local groundwater flow regime within the soil and bedrock. Any groundwater removed will be discharged into the public sewer in accordance with the necessary consent/licence issued under Section 16 of the Local Government (Water Pollution) Acts and Regulations which will be obtained from Irish Water and Westmeath County Council.

Groundwater will be pumped from excavations to temporary on-site drainage system prior to overland discharge through vegetation. The discharge will be pumped through a silt bag at the pump outlet and through a series of silt traps as required). Silt fencing will be erected on ground sloping towards the watercourses at the stream crossings. These will be embedded int local soils to ensure all site runoff water is captured and filtered.

As the construction works advances, there may be requirements to collect and treat surface water on site. The following site-specific measure are outlined in the CEMP and will be adhered to for the duration of the construction works:

- Surface water will be collected using perimeter swales at low points around construction areas, where required water will be pumped from the swales into sediment bags prior to overland discharge allow water to percolate naturally to ground or disperse as diffuse flow into local drainage ditches.

- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The discharge areas will be enclosed by a perimeter of double silt fencing.
- Any proposed discharge area will avoid potential surface water ponding areas and will only be located where subsoils are present.
- No pumped construction water will be discharged directly into any local watercourses.
- Daily monitoring and inspection of site drainage during construction will be undertaken.
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation to watercourses.

There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the Construction Phase of the Proposed Development and sandbagging of gullies may be required during specific works in the vicinity of the existing Proposed Development Site drainage.

Management from runoff from stockpiles

The stockpiling of material on-site will be avoided where possible. However, there material is being temporality stockpiled on-site pending re-use or classification for removal off-site, the material will be temporarily stockpiled in designated areas. Stockpiles will be located, arranged and managed so that the risk to receiving water and other receptors, from silt and contaminated is minimised. All stockpiled materials will be located a minimum of 50m from water courses during the Construction Phase. Silt fencing will be erected where there is a risk of run-off during prolonged rainfall.

Control and Management of Works in Site - Watercourses

All necessary works carried out in the Garrynafela stream for the construction of the culvert will following the guidelines by Inland Fisheries Ireland (IFI) Guidelines on the Protection of Fisheries during Construction Works in and Adjacent to Waters (2016) and The National Roads Authority (now Transport Infrastructure Ireland) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. All works will be carried out in accordance with an approved method statement prepared by an appropriately qualified Environmental /Ecological Clerk of Works employed by the Contractor.

A watching brief by the Environmental/ Ecological Clerk of Works will be required during all stages of the instream works of the Garrynafela stream. Continuous monitoring of turbidity and pH will be undertaken during the installation of the box culverts.

Culvert of the stream will occur at the outset of the construction works (EOBMS, 2023d).

- Culverting will take place prior to stripping of any topsoil from the Site.
- The Garrynafela Stream will be culverted during low flow/ dry conditions and undertaken in sections.
- The upstream end of the culvert will be dammed, and water will be over pumped to the downstream end.
- The pumped water will be discharged overland via silt bags at the downstream end of the culvert.

The Environmental Clerk of works will visually inspect the water quality during the work, observant of suspended sediment or contaminants to the stream. Silt fencing will be erected downstream of the section undergoing culverting, entrained sediment captured will be

removed and exported under appropriate waste disposal. Install will take during low flow conditions; no works will occur during periods of high rainfall.

Prior to installation of the culvert, a constraints zone will be identified and implemented at the construction area adjacent to the Garrynafela stream. This will:

- Ensure the avoidance of physical damage to the Garrynafela stream banks and riverbed.
- Ensure that no suspended sediment and associated nutrients are released into surface water from other
- There will be no stockpiling of construction materials or other materials within the constraints zone and excess construction material will be immediately removed from the area.
- There will be no entry for the construction of the culverts , which is strictly prohibited for plant
- All machinery operations will take place from the riverbank

Importation of Soil and Aggregates

Contract and procurement procedures will ensure that all aggregates and fill material required are sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity and compliance standards and statutory obligations.

The importation of aggregates will be subject to management and control procedures which will include testing and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development including the suitability of material that may be imported in accordance with a By-Product Notification under Article 27 of the European Communities (Waste Directive) Regulations 2011. Therefore, any unsuitable material will be identified, avoided, and not imported to the Site.

Concrete Works

The use of cementitious grout used during the construction of footpaths (and other Site infrastructure) will be required and any potential impact to water quality will be avoided through the use of appropriate design and methods that will be implemented by the Contractor and in accordance with industry standards.

Where possible precast concrete will be used for culverts and concrete works. However, where cast-in-place concrete is required (i.e., foundations, footpaths), all work will be carried out to avoid any contamination of the receiving water environment. All work must be carried out in dry conditions and be effectively isolated from any groundwater.

The following mitigation measures are outlined in the CEMP to avoid release of cement leachate to the Site:

- All ready-mixed concrete shall be delivered to the Proposed Development Site by truck. There will be no batching of wet-cement products on Site.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on Site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to

the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete.
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

The piling methodology (specified at detailed design stage) where required, will minimise the potential for the introduction of any temporary conduit between any potential source of contamination at the ground surface and underlying groundwater. The piling method will include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

Handling of Fuels and Hazardous Materials

Fuel, oils and chemicals used during construction are classified as hazardous. All fuels/soil and all storage tanks and draw-off points will be located in a dedicated, bunded and secure area of the Site. Only dedicated trained and competent personal will carry out refuelling operations. Each station will be fully contained equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on-site.

The CEMP outlines fuel and oil control procedures which will be implemented during the Construction of the Proposed Development including:

- All plant and machinery will be serviced before being mobilized to Site.
- No refueling of machinery or overnight parking of machinery is permitted in areas adjacent to watercourses or on-site drainage infrastructure.
- Fuel volumes stored on Site should be minimised. There will be no bulk storage of fuels.
- On-site refueling will only take place at distances greater than 50 meters from nearest water courses or Site drainage infrastructure. Refueling will take place by direct filling from a delivery truck or using a mobile double skinned fuel bower.
- On-site refueling of machinery will be carried out using an oil company vehicle sourced from a local supplier.
- Only dedicated trained and competent personnel will carry out refueling operations.
- A spill kit and drip tray shall be on Site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling.
- Spill kits shall be available in each item of plant required.
- Care will be taken to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.

The plant re-fueling procedures described above shall be detailed in the contractor's method statements. Re-fueling on site will only take place in designated bunded areas.

Any required quality of these materials will be stored in bunded storage tanks. Bunds will have regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for

Scheduled Activities' (EPA, 2013) and Enterprise Ireland Best Practice Guide BPGCS005. Oil Storage Guidelines. All tank and drum storage areas will, 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.

Only emergency maintenance will be carried out on-site.

Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.

Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.

In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with current industry best practice procedures and EPA guidelines.

Site staff will be familiar with emergency procedures in the event of accidental fuel spillages and all staff on-site will be fully trained on the use of equipment to be used on-site.

Welfare facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Temporary port-a-loo toilets will be used during construction. The facilities will require periodic waste pumping and waste haulage off-site. Wastewater will be taken off-site by permitted waste collector to wastewater treatment plant. The removal and disposal of wastewater from site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations. Removal of waste off-site will be carried out by an appropriately authorised contractor in compliance with all legislative requirements.

Wheel-Wash and Water Treatment Facilities

The use of wheel-wash and water treatment facilities and water treatment facilities will be used as required on Site. The correct use and management of these will be undertaken by the appointed contractor to ensure that there is no harm or impact to the receiving water environment.

To prevent tracking of dust and debris on haul routes off-site, on-site wheel washing will be undertaken for construction vehicles to remove any debris on the local roads.

15.2.4.1.2 Monitoring

During the construction phase the following monitoring measures will be considered:

- The Contractor will carry out inspections and monitoring during excavations and other groundworks to ensure that measures protective of water quality outlined in this EIAR and CEMP are fully implemented and effective.

- Routine monitoring and inspections during refuelling and concrete works to ensure no impacts and compliance with avoidance, remedial, and reductive measures.
- Baseline surface water sampling is required prior and post culvert works, upstream and downstream of the culvert. During construction of the culvert, field parameters including pH and conductivity should be regularly monitoring.
- The instream works be overseen by an appropriately qualified Environmental/ Ecological Clerk of Works (ECOW) engaged by the appointed contractor.
- Regular monitoring will be carried out by the contractor to ensure water quality protection measures (e.g., straw bales, silt fences and swales) are working throughout the entire Construction Phase. All containment and treatment facilities will be maintained and inspected regularly based on Site and weather conditions for any signs of contamination of excessive silt deposits and records of these checks will be maintained.

15.2.4.2 Operational Phase

15.2.4.2.1 Mitigation

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures in accordance with CIRIA SuDS Manual C753 will be incorporated into the overall management strategy for the Proposed Development.

With regard to the proposed discharge of treated operational surface water from the Proposed Development to the culverted Garrynafela stream, the potential for surface water generated at the Site of the Proposed Development to cause significant effects to downstream sensitivities during the Operational Phase would be considered negligible due in part to the SuDS measures and interceptor incorporated in the Project Design.

15.2.4.2.2 Monitoring

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development. The SuDS maintenance measure include:

- Permeable paving should be regularly inspected, particularly during and after heavy rainfall to ensure effective operation. Vacuum brushing/ jetting of permeable paving should be carried out once a year.
- Underground attenuation systems, inspections of the systems to be carried out monthly for the first three months and then annually to ensure the system is working correctly. Debris to be removed monthly. The internal tank requires inspection and survey every 5 years or as required if performance is reduced.
- Bio retention , routine inspections and attention to maintenance as required to ensure bioretention basins continue to operate effectively.

15.2.5 Air Quality and Climate

15.2.5.1 Mitigation

15.2.5.1.1 Air Quality

Construction Phase

It is not expected that adverse air quality impacts are likely to occur at sensitive receptors because of the Proposed Development. However, appropriate mitigation measures will be employed as necessary to further prevent such impacts occurring, as outlined in the CEMP.

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on unsurfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness;
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and
- All vehicles leaving the construction areas of the site will pass through a wheel cleansing area prior to entering the local road network.

Operational Phase

It has been determined that the Operational Phase air quality impact is negligible and therefore no site-specific mitigation measures are proposed.

15.2.5.1.2 Climate

As negative climatic impacts associated with the Construction and Operational Phases of the Proposed Development are negligible, no mitigation measures are proposed. Best practice measures will be implemented to minimise exhaust emissions from construction and operational vehicles and machinery by avoidance of engines running unnecessarily, as idle engines will not be permitted for excessive periods. Furthermore, all proposals for development will seek to achieve the greatest standards of sustainable construction and design and will have regard to sustainable building design criteria.

15.2.5.2 Monitoring

The monitoring of construction dust during the Construction Phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the site boundary. Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at a strategic locations along the site boundaries for a period of 30 +/- 2 days. The selection of sampling point locations should be carried out in consideration of the requirements of *VDI 2119* with respect to the location of the samplers relative to buildings and other obstructions, height above ground, and sample collection and analysis procedures. After the exposure period is complete, the Gauges should be removed from the site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m^2/day in accordance with the relevant standard.

The impact on air quality and climate from the Operational Phase of the Proposed Development will be assessed to determine if specific monitoring is recommended.

15.2.6 Noise and Vibrations

15.2.6.1 Construction Phase

15.2.6.1.1 Mitigation

In order to control likely noise impacts caused by the Proposed Development, best available technology will be employed by the appointed Main Contractor to minimise noise from the construction operations and will comply with the mitigation measures as set out in *BS 5228-1: A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoid 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 becomes a source of 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.

A CEMP outlines the following proposed environmental noise mitigation measures:

Proposed measures to control noise include:

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts;

- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations;
- Plant with the potential of generating noise or vibration will be placed as far away from sensitive properties as permitted by site constraints;
- Regular maintenance of plant will be carried out in order to minimise noise emissions;
- Particular attention will be paid to the lubrication of bearings and the integrity of silencers;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works;
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machines, which are used intermittently, will be shut down during those periods when they are not in use;
- Training will be provided by the Site Management to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and
- Local areas of the haul route will be condition monitored and maintained if necessary.

It is recommended that drivers of heavy goods vehicles (HGVs) associated with the development extend due care and courtesy to other road users. Excessive use of and unnecessary engine racing will be avoided.

15.2.6.1.2 Monitoring

Noise and vibration monitoring is not expected to be required for the Proposed Development. If, however, adverse noise impacts were to be identified at one of the noise sensitive locations, a boundary noise monitor may be installed to monitor noise and inform avoidance/mitigation efforts.

15.2.6.2 Operational Phase

15.2.6.2.1 Mitigation

During the operational phase of the development, noise mitigation measures with respect to the outward impact of the development are not deemed necessary.

15.2.6.2.2 Monitoring

Noise and vibration monitoring is not expected to be required for the Proposed Development. If, however, adverse noise impacts were to be identified at one of the noise sensitive locations, a boundary noise monitor may be installed to monitor noise and inform avoidance/mitigation efforts.

15.2.7 Landscape and Visual

15.2.7.1 Construction Phase

15.2.7.1.1 Mitigation

The key landscape and visual mitigation measures used during the Construction Phase have been incorporated into the layout of the site and design of the proposed buildings. The buildings will be low height (2 to 4 storey). Height and massing of the development has been given careful consideration and is considered appropriate having regard to the site's outer suburban location whilst also respecting the local context and the sloping topography of the site. Careful consideration has been given to the scale, bulk, massing and siting of the residential units. This design approach now also ensures a reduced level of engineering and site works required to accommodate the development.

A variety of materials are proposed within the development to provide visual interest and to create a distinct sense of place. The overall aesthetic concept is one of coherence and quality, balancing integration with the surrounding context and also providing for a unique and modern identity.

The measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the Site is kept tidy, dust is kept to a minimum, and that any locations close to public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound(s) and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

For those trees proposed for retention, all necessary mitigation measures will be put in place in order to prevent or reduce impact to its very minimum. Mitigation measures used will need to include the erection of protective fencing at the very start of the works, ground protection installation within root zones where fencing cannot be erected to enclose the entire root zones, monitoring of the site works by the project Arboriculturist throughout the construction process and the use of tree friendly techniques and products for the construction process.

15.2.7.1.2 Monitoring

Landscape tender drawings and specifications have been produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect. The planting works will be undertaken in the planting season after completion of the main civil engineering and building work.

Any construction works within close proximity to retained trees are advised to be undertaken in accordance with approved method statements prepared by the construction contractor under the direct supervision of a qualified consultant Arboriculturist. Therefore, during the construction works, a professionally qualified Arboriculturist is recommended to be retained by the principal contractor or site manager to monitor and advice on any works within the RPA of retained trees to ensure successful tree retention and planning compliance. The Arboriculturist is to make regular site visits to ensure that the tree protection measures are in place and adhered to.

15.2.7.2 Operational Phase

15.2.7.2.1 Mitigation

No mitigation measures are proposed for the Operational Phase of the Proposed Development.

15.2.7.2.2 Monitoring

Monitoring of the mitigation measures will form part of the landscape management plan. Replacement trees, replacement planting and pruning measures will be captured in landscape maintenance plans and are intrinsically linked to the proposed mitigation measures. All landscape works will be in an establishment phase for the initial three years from planting. A landscape maintenance plan accompanies the planning application. Prior to completion of the landscape works, a competent landscape contractor will be engaged and a detailed maintenance plan, scope of operation and methodology will be put in place.

15.2.8 Archaeology and Cultural Heritage

15.2.8.1 Construction Phase

15.2.8.1.1 Mitigation

It is recommended that a programme of invasive linear test trenching be carried out by a licensed archaeologist in the areas of sub-surface works including re-routing of services, additional drainage, slip roads, and other facilitation works associated with the proposed development site. The purpose of testing is to identify sub surface archaeological remains within the development site and to determine the impact of the proposed development on such remains if they occur. Should archaeological features and or deposits be revealed then any further work would be subject to further licensing with approval from the Department of Arts, Heritage and the Gaeltacht who may recommend preservation *in situ* or preservation by record. The testing should be completed as far in advance of other scheduled site works as possible.

The presence or otherwise of archaeological soils or deposits could also be determined by examining the reports on any engineering bore-holes and test-pits that may be carried out in advance of construction in the waterlogged area.

All recommendations in this report are subject to discussion with and approval from the Department of Arts, Heritage and the Gaeltacht.

15.2.8.1.2 Monitoring

Should archaeological features and or deposits be revealed during the Construction Phase of the Proposed Development then any further work would be subject to further licensing with approval from the Department of Arts, Heritage and the Gaeltacht who may recommend preservation in situ or preservation by record. The testing should be completed as far in advance of other scheduled site works as possible.

Therefore, all ground and earthworks shall be monitored for the presence of previously undiscovered archaeological features.

15.2.8.2 Operational Phase

15.2.8.2.1 Mitigation

Once appropriate mitigation measures such as pre-development archaeological testing and resolution of any uncovered remains are implemented there will be no archaeological impacts during the construction phase.

15.2.8.2.2 Monitoring

Following the successful implementation of the mitigation and monitoring measures outlined above no further monitoring measures will be required during the operational phase.

15.2.9 Materials Assets – Traffic, Waste and Utilities

15.2.9.1 Construction Phase

15.2.9.1.1 Mitigation

Specific avoidance, remedial and mitigation measures to be taken during the Construction and Operational Phase with respect to water supply, surface water drainage and foul water are detailed within Chapter 7, Water (Hydrology and Hydrogeology), of this EIAR. All works will be carried out in accordance with the Construction and Environmental Management Plan prepared for he Proposed Development and the Irish Water Code of Practice for Water Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). Laying of watermains/wastewater sewers and testing of pipelines and infrastructure will be in accordance with Irish Water standard details.

New connections for electricity and telecommunications will be coordinated with the relevant utility provider and Westmeath County Council and will be carried out and tested by approved contractors, as per standard protocols.

15.2.9.1.2 Monitoring

The monitoring of C&D waste during the Construction Phase of the Proposed Development is recommended to ensure that impacts are not experienced beyond the site boundary. The Resource and Waste Manger will be responsible for monitoring and record keeping in respect of waste leaving the facility and ensuring that these records will be maintained on site.

15.2.9.2 Operational Phase

15.2.9.2.1 Mitigation

An OWMP has been produced for the Proposed Development which outlines measures to be taken to achieve waste prevention, maximum recycling and recovery of waste with a focus on diversion of waste from landfill wherever possible. Waste segregation will be implemented at the Proposed Development to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery. The Management Company will be responsible for the provision of a leaflet to all new tenants encouraging good waste segregation and pictorial information detailing the waste streams that can be placed in each bin. In addition to this, clauses that support waste segregation targets will be included in relevant legal documentation e.g., tenancy agreements where possible. The OWMP also states that the facilities management company must employ suitably permitted or licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

15.2.9.2.2 Monitoring

The building management company, residents, tenants and creche operators will be required to maintain the bins and storage areas in good condition as required by the Westmeath Waste Bye-Laws. The waste strategy presented in the OWMP will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

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